A

SPECIMEN

OF SOME

Animadverſions

upon a Book, Entituled,

PLUS ULTRA,

OR,

Modern Improvements of Uſeful Knowledge.

Written by

Mr. *JOSEPH GLANVILL*, a Member of the

ROYAL SOCIETY.

Fr. Bacon de *Verul.* in Dedic. Sap. Veter. ad *Cantabrigienſes.*

Æquum eſt tamen omnia vobis *attribui, atque in* veſtrum honorem *cedere, cum* Acceſſiones quæquo principiis magna ex parte debeantur.

Mr. *Sprat.* Hiſt. R. S. pag. 319.

It is but Reaſonable, that the Original Invention *ſhould be aſcribed to the* true Author, *rather than to* Finiſhers.

Hor. ep. l. 2. ep. 1.

Ut primùm poſitis nugari Græcia bellis
Cæpit, & in vitium fortuna labier æqua,
Nunc Athletarum ſtudiis, nunc arſit equorum;
Marmoris aut eboris fabros aut æris amavit.
Suſpendit picta vultum mentemque tabella:
Nunc tibicinibus, nunc eſt gaviſa tragœdis.

LONDON,
Printed in the Year 1670.

THe favorable Cenſure of the *Reader* is craved for what *Errors* have happ'ned in Printing, which the Authors leiſure hath neither permitted him to prevent nor correct : However I am to deſire that theſe two may be thus read, *viz.* In the 2 Pag. of the *Dedication*, *line* the 11. for (*your Supporters*) read (*their Supporters*) and *pag.* 105. *lin. ult.* read *Libavius*.

N. H.

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BRITISH MUSEUM

TO THE Reader.

THE Diſcourſe of Mr. *Glanvill*, was the firſt occaſion of my *writing* about the *Royal Society*, the provocation which it gave to *all ſorts of men*, of different *Profeſſions* were ſuch, that it might ſtir up any *publick ſpirit*, to ſupport ſo *common a cauſe*. I was ſenſible of the *injuries* he doth unto the *dead*, the *affronts* he puts upon the *living*, the *contempt* wherewith he decries that *Univerſity Learning*, and thoſe *Studies* by which *Chriſtianity* hath been ſupported againſt the *Arrians*, the *Jews*, the *Mahometans*, and of late the *Papiſts* and *Socinians*: and which if they be relinquiſhed, I profeſs, that I think that the *Chriſtian Religion* muſt inevitably fall without the aid of a *Miracle*. It is a kind of *Apoſtacy* from the *Nicene* and *Athanaſian Creeds* to ſlight *Metaphyſicks*. The diſtinction of the *Trinity*, of *Eſſence* and *Perſonality*, the *Hypoſtatical Union* of the two Natures in our *Saviour*, and the *meritoriouſneſs of his death*, (which depends *thereon*,) are undermined with *School-Divinity*; and whoſoever hath any *ſenſe* or *value* for the *benefits* we derive from *Controverſial-Divinity*, either as to the *quieting of his Conſcience*, or convincing of his *Adverſaries*, muſt deteſt this Enterpriſe of Mr. *Glanvill*. And methinks that whoſoever doth but call to mind that variety of *fooliſh Sects*, which gave the *Church* ſo much trouble in its *firſt Infancy*, and of late years, and conſiders that they had their *Original* from want of *Logick*, ſhould not condemn that *Art*, by which men argue *rightly* from *ſound Principles*. It was no leſs ſtrange to me to finde the names of *Reverend*, *Sage*, *Grave*, *Diſputer* and *Logician*, perverted into terms of *Contumely*; yet had not all thoſe Motives prevailed with me, but that he had ſo defamed the *Ancient* and *Modern Phyſicians*, until thoſe late *Innovators*, that many importuned me

to revenge *my Faculty* upon this *Insolent Man.* Besides, I had been much troubled with *impertinent discourses* of some, who to excuse their *Ignorance* in the *Prognostick* and *Therapeutick* parts of *Medicine,* indulged themselves in the vilifying all the *ancient learning* and *reading,* and asserting out of the Writings of the *Society,* the *necessity* and *conveniency* of new *methods,* in *curing* and *abbreviating diseases.* I soon espied my advantages over Mr. *Glanvill.* But perceiving *his Defence* so complicated, with the *History* of the *Royal Society,* that I could not well meddle with the *one* without reflecting upon the *other*; I set my self to peruse *that* also, and found the *Errors* therein so *numerous* and *gross,* and the *tendency* of it so *dangerous,* that it seemed but an easie, yet *necessary work,* to the *Universities,* and all Learning, as well as the profession of *Methodical Physick,* to write against these new-fashion'd Philosophers; I remarked so many *defaults* in both books, that I was at last weary of taking notice of them, there being still *Plus ultra.* I resolve to give my Studies no further diversion in pursuing Mr. *Glanvill*; but to leave him to the scorn of some more *common Pens,* who being at the *Universities* may have more leisure then I have at present. After all this *Ostentation of Learning,* the things he talks and writes of are such, as he is utterly unacquainted with: the Authors he mentions *he* never *saw*, and all his discourse about the *Mathematicks,* and *Mathematicians,* procured him no other *acknowledgements* from a *Learned* and *Reverend Prelate,* (to whom he sent one of his Books) than a *Reprimand* for intermedling with what he understood not. Who can choose but smile when he reads how *Apuleius* improved the *Mathematicks* after *Euclide*? who ever heard of such men as *Maximus Palanudes, Achazen* and *Orentius*? I suppose this last should have been *Orontius,* and he is so famous a Geometrician, that when Sir *H. Savill* (as I remember) was to seek for an instance of a *pitiful fellow*; this was *the man* he fixed upon; He tells us that the most *learned* men of all sorts and professions; *Mathematicians, Chymists, Physicians, Anatomists, Antiquaries,* and *Philosophers,*

Plus Ultra. pag. 23.

Page 4.

phers, make up the *Royal Society*: but one would not gueſs ſo by their *Hiſtory*! He tells us, that the former *Methods of Science* for ſo many *Centuries*, never brought the world ſo much *practical beneficial knowledge*, as would help towards the *Cure* of a *Cut Finger*, which he ſays is a *palpable Argument*, that they were *fundamental miſtakes*, and that the *way* was not *right*. Can any one that hath heard of *Podalirius* and *Machaon* in *Homer* prate thus? *Quos tamen* Homerus *non in peſtilentia, neque in variis generibus morborum aliquid attuliſſe auxilii,* ſed vulneribus tantummodo *ferro* & medicamentis *mederi ſolitos eſſe propoſuit. Ex quo apparet has partes medicinæ ſolas ab his eſſe tentatas, eaſque eſſe vetuſtatiſſimas.* Had our *Virtuoſo* but known how *Hippocrates* had writ *about Wounds* and *Ulcers*, and that *Ariſtotle* himſelf was deſcended of the line of *Æſculapius*, and that his Anceſtor *Nicomachus* was *Phyſician* to *Amyntas* King of *Macedon*, And that *Ariſtotle* alſo was a *Phyſician*, and writ ſeveral books (beſides his *Anatomy* of *Man*) in that *Science*, and was upon that *account* valued by *Alexander* the Great, as *Plutarch* ſaith. And how little the *Ancients* ſtood in need of *modern* diſcoveries and *aids* to cure *Cut Fingers*, any man may judge, that knows what *Scribonius Largus*, and *Galen* (in his books *de Compoſ. Medicam. ſec. genera*) have written: and how this laſt Author (upon Philoſophical deductions) compounds ſeveral *Medicaments* to that purpoſe. In the *Auguſtane Diſpenſatory*, to this day his *Tripharmacon*, his *Diapalma*, his *Diadictamnum*, and others are recorded. And if any thing rendred *Paracelſus* juſtly famous, it was the cure of *inveterate Ulcers*, not *green Wounds*: and that therein he did out-doe the *ancient Phyſicians*, is a queſtion, I cannot *grant*, and have not leiſure to diſpute.

Plus Ultra Pag. 7. and 8.

Corn. Celſus in Præfat.

Diog. Laert. in vita Ariſt. *Suidas* in *Nicomacho*, & *Ammonius* in vita *Ariſt.* Vide notas *Menagii* in *Diog. Laert.* l. 5.

He reckons up *Five Inſtruments* by which the *latter Ages* have improved Knowledge above *Antiquity*. "The MICRO-"SCOPE, TELESCOPE, THERMOMETER, BA-"ROMETER, and the AIR-PUMP. Some of which were "firſt invented, all of them exceedingly improved by the "ROYAL SOCIETY. But as for the *Teleſcope*, he con-

Plus Ultra, Page 10.

'feſſes that to have been invented by *Metius* and *Galilæo*. Which *Confeſſion* of his, although it take from the *Society* all pretences to the *invention* thereof; yet it is unbecoming an *inquiſitive* perſon, who might upon *better Intelligence* from *Borellus*, in his book about the *Inventor of Teleſcopes*, publiſhed in 1656. He might have learned thence that *Adrianus Metius* of *Alkmaer* did not invent them, but one *Zacharias Joannides* of *Middleburgh* in *Zeland*, (though perhaps *Baptiſta Porta* had obſcurely propoſed it) and that he who may moſt juſtly come in for a ſecond ſhare in the glory of *that invention* is one *Joannes Lapreius* of the ſame Town. And whereas 'tis generally written, that *Galilæo* was the firſt who applied thoſe *tubes* to the contemplation of *Celeſtial Objects*, even that appears to be falſe, ſeeing that the firſt *Inventor*, even *Zacharias Joannides*, (together with his ſon *Joannes Zacharides*) did make uſe of them to diſcover ſeveral new *Phænomena* in the *Moon* and Heavens. Which miſtake is unpardonable in our *Virtuoſo* (and his Aſſiſtants) becauſe that a more particular Enquiry hath been made of late years *hereinto*, then ever before. The *Barometer* he allows to have been firſt invented by *Torricellius*, not to try the *gravitation* of the *Aire*, but to prove a *vacuum*; Afterwards, the different aſcent of the *Quickſilver*, being tried on the *top* and at the *bottom* of Hills in *France*, the opinion of the *riſing* of the *Quickſilver* from the preſſure of the *Air*, was introduced and illuſtrated. But neither is the *gravitation*, or *preſſure* of the *Air*, a *new opinion*; it is as old as *Ariſtotle*, it is *his*, and he eſſayed to *weigh* the *Air*, in his book *de cœlo l.* 4. *ſect.* 29, 30, 39. He proves the *Air* to *ponderate*, becauſe *a bladder full of Air weighs heavier then one that is empty*. Concerning which *Experiment* I ſhall adde the words of *Scipi Claramontius*, that learned Writer, the truth of it having been queſtioned, "*Poſſum tamen teſtari obſervationem* Ari-"ſtotelis *dicto faventem, fuitque diligens obſervatio, & à di-*"*ligentiſſimo penſatore, exactuſque ſtateris & lancibus peracta,*"*me præſente & adſiſtente, cum pluribus veritatis cupidis viris:*"*penſitavimus ergo primum follem novum penituſque vacuum,*"*primo ſtatera quæ ſolum unciarum differentiam indicabat, in-*

venimuſque

Borel de vero invent. Teleſcop. c. 12.

Pecquet. Experim 2. in Diſſ. anat. p. 54. Ed Pariſ. 1651.

Scipio Claramont de univerſo l. 4. c. 3.

" *venimuſque unciarum decemnovem,& totidem reperimus eun-*
" *dem follem diligenter inflatum, & ſolo ſpiritu nulloque hu-*
" *more immiſſo: ac poſtea uſi ſumus lance, quæ ſemuncias quoque*
" *indicabat, tumque follem inflatum unciarum decemnovem &*
" *& ſemis invenimus, adeo tamen ut ibi libra in æquilibrio abſ-*
" *que tractu (ut vocant noſtri) adamuſſim permaneret: at idem*
" *vacuus non amplius in eodem ſigno ſine tractu, ſed cum tractu*
" *perſtabat. Quocirca verum dicit* Ariſtoteles. So that whether we conſider the *gravitation* of the *Aire*, or its being *weighed*, (which Mr. *Glanvill* in his *Plus ultra* thinks ſo ſtrange of, as he expreſſes, " *To have ſaid in elder Time, That* " *Mankind ſhould light upon an Invention, whereby thoſe Bodies* " *might be* weigh'd, *would certainly have appeared very* wilde " *and* extravigant; *and it will be ſo accounted for ſome time* " yet, *till men have been* longer, *and are* be ter *acquainted* " *with this* Inſtrument,*&c.* The opinion it ſelf, and the attempt to weigh it, is *Ariſtotles*: Nor is this Diſcourſe caſually propoſed once in *Ariſtotle*; but ſundry times he avows the gravitation of the Air in his *Problems*, viz. *ſect.*11.*probl* 45.*ſect.*21.*probl.*18. *ſect.*25.*probl.*12,13. From hence we may judge how well Mr. *Glanvill* is acquainted with the *tenets* of *Ariſtotle*, and how *well read* he is in *him* whom he condemns. He and his *Philoſophick friends* dealt only in ſome pitiful *Compendium of Phyſics*, and from thence learned that which was the opinion of *Themiſtius*, *Simplicius*, and o her eminent *Peripatetics*, as if it had been the *avowed* doctrine of their *great Maſter*; and thereupon they thus deliver themſelves. " *And on this occaſion*, Sir, *I obſerve the incompetency of their* " *judgments, who are Enemies to the* real Experimental Philoſo- " phy, *in that they do not (as I intimated* at all, *or* very little, " underſtand *what they* condemn. *This I have ſome reaſon to* " *ſay, ſince in the whole* Compaſs *of my* Acquaintance, *which* " *is not very* narrow, *I profeſs I know not* one *who oppoſeth the* " Modern way, *that is not* almoſt totally unacquainted *with* " *it. And on the other ſide, upon the moſt careful turn of my* " *thoughts among my* Philoſophick friends, *I cannot light on* " one *of all thoſe that are for the* free *and* experimental proce- " dure, *but who hath been* very well *inſtructed in the* Peripatetick " doctrines,

Plus Ultra p.59.c.8.

Many *Peripatericks* (as *Claramontius*) [illegible] *impure* Air of our *Atmoſphear* doth *gravitate*, which they deny it as to the pure *Elemental Air*.

Mr. *Glanvill*, p.122.

Pecquet. Exper. Physico-Math. de Vacuo. Pag. 10, &c. Paris 1651.
Mersenni Phænomena Pneumat. pag. 140. Par. 1644.

" doctrines, *which they have deserted, and* most of them *much*
" better *than those who are yet* zealous Contenders *for them.*
I might tell our *Divine*, that the *Gravitation of the Air* seems
proposed in *Job* 28.25. *Qui fecit ventis pondus*, God is said
to make weight for the winde: indeed neither the gravitation
of the *Atmosphear*, nor the notion of *Aerial cylinders*, pres-
sing upon subjacent bodies, were any *News* in the world
when the *Society* was first established. But the *News* of
the *Barometer* is so *pleasant*, that I will insert the whole
passage.

Plus Ultra cap. 8. pag. 59.

" *But* (IV.) *The* BAROMETER *is another late* Instru-
" ment, *very helpful to* useful Knowledge. *That there is* gra-
" vity *even in the Air it self, and that* that Element *is only*
" comparatively *light, is now made evident and palpable by*
" Experience, *though* Aristotle *and his* Schools *held a diffe-*
" *rent* Theory: *And by the help of* Quicksilver *in a* Tube, *the*
" *way is found to measure all the degrees of* Compression *in the*
" Atmosphere, *and to estimate exactly any* accession of weight,
" *which the Air receives from* Winds, Clouds, *or* Vapors.
" *To have said in elder Times, that Mankind should light upon*
" *an Invention whereby those bodies might be* weigh'd, *would*
" *certainly have appeared very* wilde *and* extravigant; *and it*
" *will be* so *accounted for some time* yet, *till men have been*
" longer, *and are* better *acquainted with* this Instrument. *For*
" *we have no reason to believe it should have* better luck *than the*
" Doctrine *of the* Circulation, *the Theory of* Antipodes, *and*
" *all* great Discoveries *in their* first Proposals. *'Tis im-*
" *possible to perswade some of the* Indians *that live near the* heats
" *of the* Line, *that there is any such thing as* Ice *in the World*;
" *but if you talk to them of* Water *made* hard *and* consistent
" *by* Cold, *they'l laugh at you as a* notorious Romancer. And
" those will appear as *ridiculous* among the most of us,
" who shall affirm it *possible* to determine any thing of
" the *Weight* of the *Wind* or *Clouds*. *But* Experience *turns*
" *the* laugh *upon the* confident incredulity *of the* Scof-
" fer; *and he that will not* believe, *needs no more for*
" *his* Conviction, *then the labour of a* Trial. *Let him then fill*
" *a* Tube *of* Glass, *of some Feet in length, with* Quicksilver;

" *and*

" *and having ſealed one end, let him ſtop the other with his Fin-*
" *ger, and* immerge *that which is ſo ſtop'd into a veſſel of* Mer-
" cury, *the Tube being* perpendicularly *erected*; *let him then*
" *ſubſtract his Finger, and he will perceive the* Quickſilver *to*
" *deſcend from the* Tube *into the* ſubjacent veſſel, *till it comes*
" *to* 29 Digits *or thereabouts*; *there, after ſome* Vibrations,
" *it ordinarily* reſts. *The reaſon that this remainder of the*
" Mercury *doth not deſcend* alſo, *is, becauſe ſuch a* Mercurial
" Cylinder *is juſt* equiponderant *to* one *of the* incumbent At-
" moſphere *that leans upon the* Quickſilver *in the* Veſſel, *and*
" *ſo* hinders *a* further deſcent. *It is concluded therfore, That ſuch*
" *a Cylinder of the Air, as* preſſes *upon the* Mercury *in the* Veſſel
" *is of* equal weight *to about* 29 Digits *of that* ponderous Body
" *in the* Tube. *Thus it is when the* Air *is in its ordinary temper*:
" *but* Vapours, Winds, *and* Clouds *alter the* Standard; *ſo*
" *that the* Quickſilver *ſometimes* falls, *ſometimes* riſes *in the*
" *Glaſs, proportionably to the* greater *or* leſs acceſſion *of* Gra-
" vity *and* compreſſion *of the* Air *hath received from any of*
" *thoſe* alterations; *and the* Degree *of increaſe beyond the*
" Standard, *is the* meaſure *of the* additionable gravity. ——

There is ſomething ſo *charming* and ſo *divertive* in this diſcourſe, that I cannot yet diſmiſs it, notwithſtanding what I have ſaid out of *Ariſtotle* and *Claramontius*. That there is *gravity* even in the *Air* it ſelf, and that that *Element* is only *comparatively light*, was of old made evident by the *Man of Stagira*: nor did the *Schools* hold a different *tenet*, if you take *Air* for this impure mixture and *Sphæra vaporoſa* about the Earth, which we *breath*, and in a ſpecial manner have to do with: as appears from *Claramontius* in his Book of the *Univerſe*, and *Septalius* upon *Ariſtotle's Problems*. But Mr. *Glanvill* neither underſtands what *he oppoſeth*, nor what he *Aſſerts*. For in the beginning *he* ſpeaks of the gravitation of the *Element of the Air*; whereas that Inſtrument called a *Barometer* propoſeth only a way to meaſure the degrees of compreſſion in the *Atmoſphear*, in which Region I believe no man ever denied but that the *Aqueous* and *Terreſtrial* corpuſcles interſperſed had their *weight* and *preſſure*: Thus the ordinary temper of *this Air* (which is never pure) the al-

Averroes adheres to *Ariſtotle*, and holds the Air dothgravitate.

 terations

terations of it by *vapors*, *winds*, *clouds*, are the ſubject of thoſe contemplations, as any man knows that reads Mr. *Boyle*, or even Mr. *Glanvill*. Thus all the flouriſh of *Rhetorick* comes to nothing, the *wonder* is ceaſed, and we come to try only a more particular way of examining the weight of a *body*, which no man *in his wits* ever denied to be *ponderous*. And here I muſt tell our *Virtnoſo*, that his *reading* or *conſideration* extends not ſo far as to the writings of Mr. *Boyle*, and the experiment in him. For it appears out of *Him* that the *Mercurial Cylinder* riſeth and falls in the *Magdeburgical* Air-Pump, according to the leſſening or vigorating of the *Spring of the Air*: and that upon putting in the *Barometer*, " and cloſing the *Engine*, there appeared not any change in " the height of the *Mercurial Cylinder*, no more then if the " interpoſed *Glaſs-Receiver* did not hinder the immediate " preſſure of the ambient *Atmoſphear* upon the incloſed *Air*; which hereby appears to bear upon the Mercury, rather by vertue of its *Spring* then of its *weight*. And if this *Phanomenon* proved ſuch in a *greater* and *leſs Receiver*, with a *greater* or *leſs* cylinder of *Mercury* (it being indifferent which is uſed,) I doubt this *Barometer* will not *determine* the ſtrength of the *Spring* of the *Air*, much leſs its *weight*. For the *Elaſticity* is a diſtinct conſideration from the *weight* of the *Air*: as when ſome *Experimentators* went about to weigh the *Pike*, the *Flownce* or *Spring of the Pike* was no part of the weight of the *Pike*, though it might turn the *Scales*. This ſole conſideration deſtroys all the great promiſes we have from the *Barometer*, for if the *Spring of the Air* cannot be *exactly* known, that we muſt be *for ever ignorant* of the nature of thoſe other bodies which *influence* and *preſs* upon our *Air*, and compreſs the *Spring* of the *Air*, and may have many *operations* upon it which we know not, neither can comprehend; If the *height* of the *Atmoſphear cannot be determined*, (which I make a *poſtulatum* of) the *alterations* in the *higher Regions* are unſearchable, and the *mechaniſmes* of thoſe *corpuſcular combinations* incomprehenſible, I ſhall not donbt to ſay, that there is not yet found out a way to meaſure *ALL THE degrees of Compreſſion in the Atmoſphear*: nay, 'tis far from

Exper. Phyſico-Mechan. Exper. 7.

Beſides, the difference in *Quickſilver* is ſuch, that all Writers take notice of it, and I am apt to believe the *Phanomenon* may be much varyed in the *Cylinder*, according to that.

from that *exactneſs*; for the body of the *Quickſilver* varies not upon *inſenſible* variations in the *Air*: the *intercepted Air* in it takes off from the *Niceneſſe* of the *Experiment*: and ſince even *heat*, (and perhaps other circumſtances) adds to the *Spring of the Air*, it cannot give us *that* account *pretended*, about *vapours*, *winds* and *clouds*.

The *Eſſay* by *Tubes* and *Quickſilver*, as ingenious as it is, yields the *Society* no further *glory*, then to have illuſtrated it, and perhaps to have made ſome *further Experiments* in it then thoſe had done, to *whom*, as the *firſt Inventor*, (by the conceſſion of the *Hiſtorian*) appertains all or moſt of the Honour which ariſeth from *ſuch acceſſionals*. It is true, our *Virtuoſi* fixed on it the name of *Barometer*, but they had done better to have called τὸ ἔ ἔνεκα, or εὐτολέκεια, or *Gas*, or *Blas*, or *Diaceltateſton*, or ſome ſuch *unintelligible name*, rather then have termed it thus: the *Appellation* ſignifying no more *an inſtrument to meaſure the gravity of the Air*, then *an inſtrument to weigh a parcel of Tarre*, or indefinitely *a pair of Stillyards*. The *Aerometer* might have been a little more *Emphatical*; eſpecially conſidering that ἀεϱομετϱεῖν and ἀδολεχεῖν are *Synonimous*. Had not *Aeroſcopium* been accommodated to the *Thermometer*, it would not have been *much incongruous*. But I conceive, that *Aerobaricon* or *Aeroſtaticon* would have fitted the *Experiment* as well as any *name* I can now think upon. The *Barometer* was invented by *Torricellius* to prove a *Vacuum*, and in *Merſennus*'s *Cogitata Phyſico-Mathematica*, you may find it applied to the examining the difference of the *Air* in ſeveral places. The Air-Pump was found out at *Magdeburgh*, and not in *England*; it was firſt publiſhed by *Schottus*, under the name of *Inſtrumentum Magdeburgicum*. Mr. *Boyle* amended it, and proſecuted many *ingenious Experiments* in it, for which all Philoſophers are redevable to *him*, but cannot proclaim him the *Inventor* of the *Inſtrument*, no, nor of the (notion of the *Elaſticity of the Air*, which was propoſed firſt to the world by *Henricus Regius*, under the name of the *ſpontaneous dilatation of the Air*: and illuſtrated by *Pecquetus*, who firſt, (that I know of,) ſpoke of the *Elater*, *Pecquetus pag.* 49 (*quem elaterem nuncupo*)

Hen. Reg. *Philoſ Nat. l.*2 *c.* 12. *p.*74. *& l.*2 *c.*3 *p.* 173. *ed.* 1661.

Borel *ubi supra* c.12. p.26. Blancanus *de mundi fabr.* part. 3. c 2.

nuncupo). The *Microscope* was invented by the aforesaid *Zacharias Joannides*: The *Thermometer*, or *Thermoscopium* was first the invention of *Sanctorius*; so *Blancanus* saith, *Audivi Doctorem quendam medicum Patavii degentem, qui* Sanctorius *cognominatur, hujus esse* inventorem And now I demand of our *Virtuoso*, which of these *Five Instruments for the Improvement of knowledge* have been found out by the *Royal Society*: The *Thermometer* is the discovery of a *Galenical* Physician; but as to our *Virtuosi* nothing appears but the *pretension to other mens discoveries*, and the *improving* of them.

By the Benefit indeed of *one* of these *Instruments*, the *Te-* "*lescope*, we are put in hopes to find a sure way to deter- "mine those *mighty Questions*, Whether the *Earth move?* "or, The *Planets* be *inhabited?* And who knows which way "the *Conclusion* may fall? —I perceive hereby that Mr. *Glanvill* is not *altogether* convinced that the *Earth moves*; and I am as little satisfied, that the solution of *those Questions* is so *mighty* and important a thing; for if the *Earth* stand still, then things will be as *they are* now: and if it be *determined otherwise*, yet shall we not need to fear that the *Revolution of the Earth* in its *Diurnal motion*, either shake *our houses about our ears*, or shake us off by the *tangent line*: and as for those *inhabitants of the Planets*, in case all our other *trading* should be lost, we shall not finde *out* any *gainful commerce* with *them*; nor need we dread that they will *piss out our Eyes* as we look up. So that let their Telescopes be brought to that *unimaginable* perfection, whereby to discover the *inhabitants of the Planets* as plainly as *mites in Cheese*, and let the *Conclusion* fall which way it will, things will fall out no otherwise than they do.

He inveigheth bitterly against *Aristotle* for his *Heathen-Notions*, and in his Preface to the Clergy of *B.* & *W.* wishes that the devoted Admirers of *Aristotle* would study his *Rhetorick*, *History of Animals*, and *Mechanicks*. I wonder he did not recommend unto them the perusal of his *Ethicks*. Certainly they deserve as much to be read *in these days*, as any Piece.

And

And perhaps his *Politicks* might contribute ſomething to the inſtruction of a *Nation*. But how dare he recommend any book of that man of *Stagira* to be read, if thoſe motives that ſwayed him to *Anti-Ariſtoteliſm*, be of any *validity*: Alas! he is troubled at his *Heathen-Notions*! Oh! rare *Puritaniſm*! But my dear Brother *Scruple*, ought any one to be offended at every thing that is of *Heathen-Original*, though it contain nothing of *Gentiliſme* in it? Repreſent your adverſary as you pleaſe to his *Dioceſan*, nothing hath more of the *Presbyterian* and *Fanatick* then this *Topick*. Moreover, what do you think of thoſe *Atoms* and *Corpuſcles*? are they not *Heathen-Notions*, and decried by the *Fathers*? what do you think of the terms uſed by the *Mathematicians*? what of the *Langnages*, ſuch as are not *Sacred*? what of the months, days of the year, and the names of the *Stars*, *Conſtellations*, *&c.* Muſt every thing be reformed according to the *Cœlum Stellatum Chriſtianum* of *Julius Schillerus*? Beſides, theſe words in *Theology*, of *Unity* and *Trinity*, have as much of *Heatheniſm* in them, as they have of *Platoniſm*. I ſhall here take further notice of his *exceptions* againſt *Ariſtotle*, as they are Recapitulated here (though they are more largely propoſed by him in his *Letter* againſt *Ariſtotle*, which I have fully anſwered in a diſtinct Treatiſe) the *generall cenſure* whereof is, That they are nothing but *Lies*, and ſuch as no man that is acquainted with any thing of *ancient Literature* could have uttered. I proteſt in *the Preſence of Almighty God*, that if there be not great care taken, we may be in a little time reduced to that paſs, as to believe the ſtory of *Tom Thumb*, and all the *Legends* or *falſifications of Hiſtory*, which the *Papiſts* obtrude upon us! This Philoſophy fairly diſpoſeth us therevnto, by taking us off from the *Pedantiſm* of *Philology*, and *ancient reading*, and by accuſtoming us to believe the *forgeries* they obtrude upon us. Methinks herein he is one as abſurd as that *Romiſh Monk* was in the Pulpit. *Heresbachius* l. C. citante Taubmanno, *audivi*, inquit, *Monachum in Eccleſia declamantem, qui, nova, inquiebat, jam reperta eſt Lingua, quæ vocatur Græca, ab hac ſedulò cavendum: Hæc enim eſt quæ parit omnes*

Jo. Hen. Hottingerus in Smegm. Oriental. l. 1. c. 2. p. 2.

omnes iſtas heræſes. Ea lingua eſt liber proditus, in manibus paſſim habetur & vocatur N. T. *Plenus hic liber rubetis, & viperis. Alia etiam oritur lingua, quam vocant Hebræam, hanc qui diſcunt, efficiuntur Hebræi.* We are running on as faſt as we can to this condition of *ignorance*, and ſhall be ſo inured to *Hiſtorical* untruths, *magiſterially* impoſed upon us, and diſuſed from inquiring into *them*, as to *beleeve any thing*. He tells us the *Ariſtotelian* Philoſophy aims at *no more*, than the inſtructing men in *Notion* and *Diſpute*, that its *Deſign* was mean, and its *Principles* at the beſt uncertain and precarious,—— One may gueſs how well our *Virtuoſo* underſtands the *Old Philoſophy*, to aſcribe that unto it all in general as *its aim*, which is but the intendment (and that a neceſſary one too) of the *Dialectick* and *Metaphyſical* parts. In *Natural Philoſophy* their deſigns were the ſame that our *Moderns* boaſt of, if they miſcarried in the *main*, let us pity their misfortunes, but not blame their *intentions*. Did *Ariſtotle* in his books of *Animals*, or *Theophraſtus* about *Plants*, inſtruct men only to *Diſpute*? Had his *Anatomy*, and his *Problems* nothing but Notion? Muſt we caſt off all *Notions*? Or ought we to endeavour after the gaining of *clear notions of things*? If men hitherto did proceed no further, and yet pretended to be *Peripateticks*, blame the *abuſe*, but condemn not the *Philoſophy*, which hath nothing in it that puts a ſtop to *Enquiries* and *Curioſity*. Nor do I find that thoſe *Phyſicians*, and others, who advanced the ſeveral parts of *Natural Philoſophy* and *Phyſick*, did thereby act contrary to the rules of their *Maſter* or *Tutors*. It is true, that their *Schools* did meddle but with *few points* mainly, and thoſe were ſuch as related to *Divinity*, as *the Eternity of the World, the Nature of the Firſt and Second Cauſes*, of the *Soul and its Faculties*, &c. as to an exact *natural Philoſophy*, they did not much trouble themſelves, nor had we had what we have, but that *Averroes* and the *Phyſicians* befriended us. But muſt *Scaliger* and ſuch like ſuffer under theſe *Imputations*, which particularly relate unto their *School-Divines*? and muſt *they* alſo be blamed for not teaching nor putting men upon *further Enquiries* than were neceſſary to that *Chriſtianity*, which they were

to

to ſupport againſt the *Mahometans* and *Jews*? He that knows the end of *their* firſt inſtitution by *Charlemaigne*, can beſt judge how *prudential* it was, and how they anſwered *expectation*. But our *Illiterati* know nothing of *that*, and are always reviling *them* where they are not *faulty*, and would have had them nglected that part which was *neceſſary* to the *Education* of all that were to live *under* and *ſupport Chriſtianity*, to purſue *Studies* that contribute *little* thereto, and ſuch as were never *eſſential* to the being of a *State*, but have been often *exploded* as *prejudicial thereunto*. The ſame *Apology* may ſerve the preſent *Univerſities*, who do enough in breeding up men to be fitly qualified for *Employments* in *Church* and *State*, and inſtruct them in ſo much *Philoſophy* as is neceſſary for the explaining and defending of our Religion againſt *Atheiſts*, *Papiſts*, and *Socinians*: and whoſoever ſhall put the *accurate debate* of *theſe Points*, *the Art of reaſoning*, *the Validity of Conſequences*, *the unfolding of crytical Syllogiſms and Fallacies*, *the general doctrine of Topicks*, the *Moral Philoſophy*, and *Foundations of Civil Prudence*, (beſides *Civil* and *Eccleſiaſtical Hiſtory* and *Languages*) which are taught there, or ought to be by their *Conſtitution*, into the *Scales* on one hand, and the *Mechanical Education* (recommended with all the advantages that ariſeth from *Aphoriſms of Cider*, *planting of Orchards*, *making of Optick Glaſſes*, *magnetick* and *hortulane Curioſities*) on the other hand, will be able to judge eaſily which *Studies* deſerve the *moſt encouragement* by the *publick*, and which are moſt *uſeful* and requiſite. Having ſaid thus much in behalf of our *Univerſity-Learning* (which is now *contradiſtinguiſhed* from the *Mechanical Education*) I ſhall adde thus much in favour of our *Anceſtors*, who gave ſolemn encouragement to *Archery*, *Cudgel-playing*, *Foot-ball-playing*, and other *Exerciſes*, that prepared the Vulgar to *Military Performances*; as the more *Academical* did the *Gentry* to *State-affairs*: whereas they gave little countenance to the *Experimental Philoſophers* and *Naturaliſts*: that the practice is juſtified by *Vegetius* l. 3. c. 10. *Quis autem dubitat artem bellicam rebus omnibus eſſe potiorem, per quam libertas retinetur, & dignitas propagatur, provinciæ conſervantur & Imperium*

See Mr *Sprat*, p. 329.

Imperium? Hanc quondam relictis doctrinis omnibus Lacedemonii, *& poſt coluere* Romani. *Hanc ſolam hodieque* Barbari *putant eſſe ſervandam: cætera aut in hac arte conſiſtere, aut per hanc artem aſſequi ſe poſſe confidunt. Hæc dimicaturis eſt neceſſaria, per quam vitam retineant & victoriam conſequantur.* But to return to our *Virtuoſo*! Are not the principles of *Des Cartes*, and the *figured Atoms* of *Gaſſendus* as *precarious* as thoſe of *Ariſtotle*, and leſs ſubjected to *ſenſe*? Have not the *Chymical Principles* ſo much of *uncertainty*, as they have of *Equivocation*? Are not they *precarious* too, and ſuſpicious? Are there any of *thoſe* that agree amongſt *themſelves*? and do not they as little agree with *Nature* as thoſe of the *Peripatetick way*? I will not doubt to maintain that as far as *Phyſick* is concerned in the debates; The ancient *Philoſophy* better agrees with the *Phænomena* of *Nature*, and carries us on with more aſſurance to *work* (as they phraſe it) then any other, and that the diligent reading of *Valleſius*, *Mercatus*, *Saxonia*, *Claudinus*, *&c.* ſhall produce better Phyſicians then *Sylvius*, *Helmont*, or *Odorode*. And whoſoever reſolves any of the other Queſtions in the *Negative*, whatever he *pretend*, hath never conſiderately ſtudied the *Points*. Give therefore the *Ariſtotelians* leave to hold an *Hypotheſis*, which is accommodated to the *polity* of our *Nation*) at leaſt as *revocable*, till a better be *introduced*; and do not proceed in an exterminative way, till ſomething elſe be ready to be *ſubſtituted*.

Analogicè ſi accipiantur hæc Chymicorum principia aſſentiri eis poſſumus, ita ut pro Mercurio *aqua* ponatur, *Sulphure ignis & aer*, Sale *terra*. Analogiâ negatâ negatur omnia eo abire. Ex aqua & terra fac *limum* viſcidum, & hunc cum æ conglutinari & concreſcere in lapidem: quemadmodum naturâ in rebus videmus. Si hic reſolvatur in ultima non in *Mercurium*, *Sulphur*, & *Salem*, ſed in vulgata & Phyſica reſolvetur principia. *M. Ruland. Progymn. Alchym Qu.* 6.

If *Notions* might be rejected for being firſt propoſed and uſed by *Heathens*, then is not *Ariſtotle* in a worſe condition then *Epicurus*, *Democritus*, *Plato*, or *Pythagoras*; If *Impiety* in the *Teacher* may authorize us to reject doctrines *not impious*, I think the condition of our *Stagirite* not to be worſe then that of other ancient *Philoſophers*, and better then ſome of the *New*. That there is *impiety* enough in *Gaſſendus's* Anſwer to *Des Cartes*, any *Chriſtian* will grant, eſpecially if he be a *Proteſtant*. And the life of *Des-Cartes* had

had but little of the *Saint*: this is manifeſt. And I deſire Mr. *Glanvill* to acquit *Paracelſus* from being *impious* in his *life*, and many of his *doctrines*. If he was a *Corrupter* of the *Wiſdom* of the *Ancients*, for *miſ-citing*, and miſrepreſenting *their* opinions; and muſt therefore be condemned and rejected: who can approve of Mr. *Sprat*, Mr. *Glanvill*, and their *Adherents*? He ſaith, that *Ariſtotle was of no ſuch ſuperlative Account in the wiſeſt times*. But he tells us not which thoſe *moſt wiſe times were*, when he was in *diſeſteem*. I have not read of any more wiſe people, then *Greece*, *Rome*, and the *Mahometans*, under their firſt *Caliphs* and King *Almanſor*. And yet all theſe admired him at ſeveral times. He that chargeth *Philip* of *Macedon*, *Alexander* the Great, and his Succeſſors, (particularly the *Ptolomyes* of *Egypt*,) with *Folly*: and *Sylla*, *Tully*, and thoſe other *Romans* that admired him, with want of *wiſdom*; Or, who thinks that the *Empire* of the *Moors*, and their *Academies* at *Bagdod*, *Fez*, and *Cordula*, were compoſed of a ſort of *Simpletons*, may go ſeek for the *wiſe* and the *prudent* in *Gotam Colledge*. And perhaps thoſe *Chriſtians* that celebrated *Ariſtotle*, and advanced him to that *repute* in their *Kingdoms* and *Univerſities*, were not *Idiots* or *Changlings*. That *He was much oppoſed and ſlighted by the firſt Fathers*, is an Objection that hath ſome truth in it, but not much to the *particular* prejudice of our *Stagirite*. For at firſt they hated and deteſted all *humane Learning*, and *Philoſophy*; and when they came any of them to admit of thoſe *Sciences*, then they divided into the *Ariſtotelians* and *Platoniſts*, as they did into *Arians* and *Catholicks*: That the *Arians* were *Ariſtotelians*, is to me as evident, as that *Mahomet* taking the advantage of that *faction*, and of the *brutal lives* and *ignorance* of the *Catholiques* depending upon the *Patriarch* of *Conſtantinople*, did advance the Sect of *Chriſtians*, called *Mahometans*; and *his* Succeſſors the *Caliphs*, did

I cannot finde any ground to conclude *Ariſtotle* ſo wicked. If we indemnifie him for having an hand in poiſoning *Alexander*, (which perhaps is not true). In his *laſt Will*, there is much *generoſity*: in his *life*, many teſtimonies of a *ſingular* vertue: in his diſcourſes much *wit* and *worth*. He writ an *Apologie for Piety*; got the walls of his deſtroyed Country to be *rebuilt*, and made excellent *Laws* for it. *Philip* choſe him to breed up *Alexander*. And thoſe are greater aſſurances that he was not ſo wicked, as he is reported by his adverſaries. They repeat nothing but old lies, ſuch as *Apellicon* refuted: and *Ariſtocles* ſaith, προδηλον πεπλασται. See *Caſaubon* upon *Diog. Lart.*

I desire that the *Virtuosi* would enquire after the *Peripatetick* Philosophy, at *Alexandria* after the *Ptolomies* and not at *Athens*. And when they have done that, and studied the condition of *Christianity*, during the time of the *Arrians*, and enquired into the rise of *Mahomet*, the circumstances that advanced *him*, and contributed to the spreading of *his doctrine*, and increase of that Empire under the *Caliphs*, then they will be able to judge of the truth of what their *Historian*, and Mr *Glanvill* writes in the books *animadverted on*, and in his Letter concerning *Aristotle*.

wholly employ themselves to improve the doctrines of *Aristotle* and the *Peripateticks*. So that *Aristoteliſm*, *Arianiſm*, and *Mahometaniſm* issued out of the same parts of the world, *viz. Alexandria*, and the adjacent Countreys: Nor was it *Chance* or the *black ignorance of the Age*, but great *prudence* in *Charlemaine* and his Successors in the *West*, that brought in *Aristotle*: as any man will say that understands the circumstances of those dayes. But so much History is above the reach of my *Experimental Philosopher*: To supply *that* defect, *Christians* must be *once more* told, that *since their minds are enlightned with the rays of the glorious Gospel, they have less reason to bow down to the Dictates of an Idolater and an Heathen.* And so *farewel* to the *Rhetorick* and other works of *Aristotle*, which our *Virtuoso* a little while agoe recommended unto us. Let us shake hands with *Seneca*, and *Epictetus*, and *Plato*: and joyn with *Tertullian* in that saying, *Nobis Philosophia opus non est post Jesum Christum, nec Aristotele post Evangelium.* Having said thus much to these *grand accusations* against *Aristotle*, with which Mr. *Glanvill* was so perplexed, I suppose he may think that a more *devout Admirer* of *Aristotle* then I am, with more time, may say enough to convince him, that it was his fault, and not the *Peripateticks*, that he benefited so little by them. And I pray what language did *Epicurus*, *Pythagoras*, and *Philolaus* make use of? *He* writ better about *divine* things than *Plato*, as *Vossius* witnesseth, *Quanquam multa de Deo scripta sunt a* Platone, *accuratius tamen apertiusque de iis egit* Aristoteles. He cites a passage of *Plato*, ὁ Θεὸς γεωμετρεῖ, and adds, that the *Universe* must be known by the *Art*, by which it was made. If it be not to be known any other way, it is unintelligible. Let him answer Dr. *More*'s Dialogues upon that point, where he explodes the *Mechaniſm of Nature*: and reckons upon *Des-Cartes* as the most *prodigious Fool* that ever was, for holding that opinion. I shall adde, that *Geometricians*

tricians are commonly a ſort of men, that being once got out of *their Science*, they are far from being elevated and improved thereby: And the reaſon is, becauſe that the ſevere procedure of *Mathematical demonſtrations*, and *their* ways they take to demonſtrate things appertaining to *their Science*, theſe do not qualifie a man *at all* for thoſe *argumentations* which ſway and guide in *Metaphyſicks*, *Ethicks*, *Politicks* and *Religion* it ſelf. Upon this account *Ariſtotle* obſerved, that a *child* might become a *Mathematician*, but not a *Politician*, or *Moraliſt*. Hence it is, that *Geometricians*, (except their ſtudies have particularly acquainted them with thoſe *Dialecticks*, which regulate the *generality* of Mankinde in *ſuch diſcourſes*,) ſeldom, if ever, prove *Metaphyſicians*, *Religieuſe*, or otherwiſe of *tolerable ratiocination*: either rejecting as *falſe*, *frivolous*, and *demonſtrable* thoſe *reaſonings* and *ſtudies*, according to which *humane affairs* are regulated; or elſe *ignorantly*, running into *Whimſeys*, and *phantaſtical ways of arguing*. Neither is this more manifeſt, then I think theſe *two Concluſions* are, which I deduce from *thence* in oppoſition to ſome *Comical Wits* in their *Hiſtory*, viz. *Ariſt* Eth. l. 6. c. 8.

That by how much more *general* as to *publike* and *private uſe* and *emolument* in order to *domeſtick* affairs, or *Civil Prudence* and the preſervation of *Humane Society* and *Government* thoſe things are, which depend upon *perſwaſive Arguments*, and thoſe *topicks* and methods of *ratiocination* which are laid down by *Ariſtotle*, not *Euclide*: by ſo much thoſe *courſes* ought to be *purſued*, *upheld* and *encouraged* by underſtanding *Stateſmen* which are *ſubſervient thereunto*, above the *leſs neceſſary* and *utile Mathematicks*.

Next, That the *Mechanical Education*, or that whereby Youth are inured at firſt to *vigorous demonſtrations*, *and neceſſary deductions from evident Principles*, and a *Philoſophy* that is purely *Corpuſcularian*, ought not to be premiſed or preferred to *other ſtudies* in order to the fitting men for *humane life*: ſeeing either *accidentally*, (yet ſo, as in regard of our *depraved nature* it is almoſt *unavoidable*) or *intrinſecally* thoſe *courſes* diſpoſe mens minds afterwards to *Atheiſm*, or an *indifference* in *Religion*, and *inhabilitate* them towards thoſe *more* Hiſt. of the R. S. p. 319.

I could wish that the *Virtuosi* would enquire after the *Peripatetick* Philosophy, at *Alexandria* after the *Ptolomies* and not at *Athens*. And when they have done that, and studied the condition of *Christianity*, during the time of the *Arrians*, and enquired into the rise of *Mahomet*, the circumstances that advanced *him*, and contributed to the spreading of *his doctrine*, and increase of that Empire under the *Caliphs*, then they will be able to judge of the truth of what their *Historian*, and Mr *Glanvill* writes in the books *animadverted on*, and in his Letter concerning *Aristotle*.

wholly employ themselves to improve the doctrines of *Aristotle* and the *Peripateticks*. So that *Aristoteliſm*, *Arianism*, and *Mahometanism* issued out of the same parts of the world, *viz.* *Alexandria*, and the adjacent Countreys: Nor was it *Chance* or the *black ignorance of the Age*, but great *prudence* in *Charlemaine* and his Successors in the *West*, that brought in *Aristotle*: as any man will say that understands the circumstances of those dayes. But so much History is above the reach of my *Experimental Philosopher*: To supply *that* defect, *Christians* must be *once more* told, that *since their minds are enlightned with the rays of the glorious Gospel, they have less reason to bow down to the Dictates of an Idolater and an Heathen.* And so *farewel* to the *Rhetorick* and other works of *Aristotle*, which our *Virtuoso* a little while agoe recommended unto us. Let us shake hands with *Seneca*, and *Epictetus*, and *Plato*: and joyn with *Tertullian* in that saying, *Nobis Philosophia opus non est post Jesum Christum, nec Aristotele post Evangelium.* Having said thus much to these *grand accusations* against *Aristotle*, with which Mr. *Glanvill* was so perplexed, I suppose he may think that a more *devout Admirer* of *Aristotle* then I am, with more time, may say enough to convince him, that it was his fault, and not the *Peripateticks*, that he benefited so little by them. And I pray what language did *Epicurus*, *Pythagoras*, and *Philolaus* make use of? *He* writ better about *divine* things than *Plato*, as *Vossius* witnesseth, *Quanquam multa de Deo scripta sunt a* Platone, *accuratius tamen apertiusque de iis egit* Aristoteles. He cites a passage of *Plato*, ὁ Θεὸς γεωμετρεῖ, and adds, that the *Universe* must be known by the *Art*, by which it was made. If it be not to be known any other way, it is unintelligible. Let him answer Dr. *More*'s Dialogues upon that point, where he explodes the *Mechanism of Nature*: and reckons upon *Des-Cartes* as the most *prodigious Fool* that ever was, for holding that opinion. I shall adde, that *Geometricians*

tricians are commonly a ſort of men, that being once got out of *their Science*, they are far from being elevated and improved thereby: And the reaſon is, becauſe that the ſevere procedure of *Mathematical demonſtrations*, and *their* ways they take to demonſtrate things appertaining to *their Science*, theſe do not qualifie a man *at all* for thoſe *argumentations* which ſway and guide in *Metaphyſicks*, *Ethicks*, *Politicks* and *Religion* it ſelf. Upon this account *Ariſtotle* obſerved, that a *child* might become a *Mathematician*, but not a *Politician*, or *Moraliſt*. Hence it is, that *Geometricians*, (except their ſtudies have particularly acquainted them with thoſe *Dialecticks*, which regulate the *generality* of Mankinde in *ſuch diſcourſes*,) ſeldom, if ever, prove *Metaphyſicians*, *Religieuſe*, or otherwiſe of *tolerable ratiocination*: either rejecting as *falſe*, *frivolous*, and *demonſtrable* thoſe *reaſonings* and *ſtudies*, according to which *humane affairs* are regulated; or elſe *ignorantly*, running into *Whimſeys*, and *phantaſtical ways of arguing*. Neither is this more manifeſt, then I think theſe *two Concluſions* are, which I deduce from *thence* in oppoſition to ſome *Comical Wits* in their *Hiſtory*, viz. *Ariſt* Eth. l. 6. c. 8.

That by how much more *general* as to *publike* and *private uſe* and *emolument* in order to *domeſtick* affairs, or *Civil Prudence* and the preſervation of *Humane Society* and *Government* thoſe things are, which depend upon *perſwaſive Arguments*, and thoſe *topicks* and methods of *ratiocination* which are laid down by *Ariſtotle*, not *Euclide*: by ſo much thoſe *courſes* ought to be *purſued*, *upheld* and *encouraged* by underſtanding *Stateſmen* which are *ſubſervient thereunto*, above the *leſs neceſſary* and *utile Mathematicks*.

Next, That the *Mechanical Education*, or that whereby Youth are inured at firſt to *vigorous demonſtrations*, *and neceſſary deductions from evident Principles*, and a *Philoſophy* that is purely *Corpuſcularian*, ought not to be premiſed or preferred to *other ſtudies* in order to the fitting men for *humane life*: ſeeing either *accidentally*, (yet ſo, as in regard of our *depraved nature* it is almoſt *unavoidable*) or *intrinſecally* thoſe *courſes* diſpoſe mens minds afterwards to *Atheiſm*, or an *indifference* in *Religion*, and *inhabilitate* them towards thoſe *more* Hiſt. of the R. S. p. 329.

important, but *less delightful studies* of *Law*, *Policy*, and *Religion*, with their *several dependencies*.

I finde that *Aristotle* hath complained of some, that in their Explications of Nature made too much use of *Geometry*. *Magnenus* hath complained also of them; and *Conringius*, *Bullialdus*, and *Ricciolus*, of *Kepler*; and *Bodinus*, in his *Theatrum Naturæ l.5.* and all *Physicians* almost of *Des-Cartes* his ridiculous book *de Homine*. And if *Plato* was so solicitous, that none but *Geometricians* should come into his *School*, yet he sent them very *fools* out, if they allowed of his *Logick* and *Physiology*. I shall leave the further defence of *Aristotle* to others; only I must tell him, that *Vossius* in his account of *Geometricians* allows of *Aristotle* for *no mean one*. And we find that he supposeth his *Scholars* not ignorant in *Geometry*, since without that knowledge they could not understand his *Analyticks*, nor that part of his *Ethicks*, where he illustrates *Justice* by the *Arithmetical* and *Geometrical proportions*. And as for his *Ethnical opinions*, it is ridiculous to upbraid the *University-Learning* with them, since they are not taught, but *solidly refuted* there, However if *Aristotle* must suffer on this Account, let not *Epicurus* triumph. He tells us that *Archytas*, that great Geometrician was scared from *Mechanical* and *Organical Methods* to the *great hinderance of beneficial Improvements that way, so that he kept himself up in Abstractive Contemplations*. I cannot finde any such thing in his life written by *Diog. Laertius*, but the contrary, οὗτος πρῶτος τὰ μηχανικὰ ταῖς μηχανιχαῖς προσχρησάμενος ἀρχαῖς ἐμεθώδευσε, καὶ πρῶτος κινησιν ὀργανικὴν διαγράμματα γεωμετρικῷ προσήγαγε. He made a Pidgeon of wood *artificially* to flie. So *Favorinus*. Ἀρκύτας ταραντῖνος φιλόσοφος ἅμα καὶ μηχανικὸς ὤν, ἐποιησε περιστερὰν ξυλίνην, πετομένην ἥτις εἴποτε καθίσειεν, οὐκέτι ἀνίστατο. I wonder oftentimes how He did to commit so *many mistakes*; and I cannot believe that He or his *Philosophick friends* were ever well instructed in the *Peripatetick doctrines*, who are so ill taught in all manner of *Humane Learning*. I resign him up to

Vide *Ricciolum* in *Almagest nov.* l.4. p 278.

See Mr. *Parkers* censure of the *Platonick Philosophy*.

Vide *Blancanum* in loca Mathematica *Aristotelis*.

Epicurus Mathesin insuper habuit: unde ut *Plutarch.* ait libro *contra Epicurum*. Philosophum quendam nomine Apellem, eo nomine laudabat, quod ab adolescentia nunquam esset contaminatus disciplinis Mathematicis. *Vossius de Philos. sect. c 8 sect. 7.*

Diog. Laert. *l.* 8. in vit. *Archytæ*.

Gellius x. 12.

to be the ſcorn and entertainment of others henceforth. Nor will I engage *particularly* in the diſpute betwixt *him* and Mr. *Croſs*. I am informed, that the *Relation* is very *falſe*; and I profeſs I have no mind to believe this *Virtuoſo* in any thing he ſays. It is eaſie for him to miſreport a *private diſcourſe*; His great and admired friend Mr. *Sprat* relates general Encounters falſe; He tells us, "*Of a miſchance* "*that befel the* Chriſtian *Army in* Egypt *in the time of the* "Holy Warre. *Their ſtrength was great and irreſiſtible, if* "*they had only underſtood that which every* Egyptian *could* "*have taught them, the courſe and* the time of the overflow- "ing of the Nile. *For the want of that ſlender knowledge,* "*the braveſt men of all* Chriſtendome, *were led up to the Neck* "*in the* River, *and were forced to yield to the Enemies condi-* "*tions without ſtriking a ſtroke. This was occaſioned by the* "*ſtupidity of the* Cardinal *who commanded them. If he had* "*been leſs skilful in the* Schoolmen *and more in* Nature, *that* "*dreadful diſaſter had never happened.* — Such an untruth as the *Hiſtorian* tells here, ſuch perhaps is the *Narrative* of what paſſed betwixt him and Mr. *Croſs*. I cannot finde any ſuch Story in *Fullers Holy Warre*, but the contrary, *viz.* "E- "gypt *is a low level Countrey except ſome few advantages, which* "*the* Egyptians *had fortified for themſelves. Through the midſt* "*of the Land runs the River* Nilus, *whoſe ſtreams they had ſo* "*bridled with banks and ſluces, that they could keep it to be their* "*own ſervant, and make it their Enemies Maſter at pleaſure.* "*The* Chriſtians *confidently marched on, and the* Turks *per-* "*ceiving the Game was come within the wile, pierced their* "*banks, and unmuzling the River, let it run open mouth upon* "*them, yet ſo that at the firſt they drowned them but up to the* "middle —— *not to the neck.* There is no body charges the *Cardinal Pelagius*, who was *Legate*, and commanded the Army there, for invading *Egypt* in an unſeaſonable time, nor with being ignorant of the time when *Nile* did overflow. The *Chriſtians* were not ignorant of that, who had diſcovered and invaded *Egypt* before in 1218, and this was but two years after in 1220. The *Egyptians*, 'tis true, dammed up the River (which was now low) and upon the approach of the

Hiſt. of the R.S. Pag. 412.

Fullers Holy War, l. 3. c. 27.

the *Cardinal* cut their banks, and so gained the victory. That the *Cardinal* was no *Souldier*, and unacquainted with Stratagems of war, I grant; and for this Historians condemn him, but not for being ignorant of that part of *Natural Philosophy*. A Member of the *Royal Society* published lately an account of the *Original of Nile*. The Description had nothing of *News* in it to any *Scholar*, that was material. But they should have procured an account of the manner of the inundation of *Nile*, for the *Historian* is more ignorant then the *Cardinal* of it. Had it been the time of the beginning of the overflowing of *Nile*, they might have retired easily to *Damiata* without damage; for it never exceeds in rising above ten inches each day, sometimes it ariseth not *eight inches*. Just such an Account, I fear, doth Mr. *Glanvill* give of Mr. *Cross*'s discourses, whom report speaks so advantagiously of, that we must give the Lie to *general fame*, or believe him a *very learned Person*, as well as *pious*. Perhaps he, as well as my Lord *Bacon* might suspect the truth of those *Telescopes*. And perhaps also he might be mistaken in saying that *Aristotle* did *travel all over Asia*: yet, however that, that *Jonssius* (*de Script Philos. l.*1 *c.*18.) disproves *that opinion*, yet no less man then *Josephus l.* 1. *adv. Apionem*, was deceived as well as Mr. *Cross*. *Solinus* also *c.* 14. and *Ammonius* in the life of *Aristotle* say, that *Aristotle* did accompany *Alexander* in his *Asiatick* Expedition. And I professe my self in an errour as well as Mr. *Cross*, if it be not true, that *Aristotle* had sundry advantages to pen his *History of Animals* which our *Virtuosi* want. *Pliny* Nat. Hist. l. 8. c. 16. saith, *Alexandro Magno rege inflammato cupidine animalium naturas noscendi, delegataque hac commentatione* Aristoteli, *summo in omni doctrina viro, aliquot millia hominum in totius* Asiæ, Greciæque *tractu parere jussa, omnium quos venatus, aucupia, piscatusque alebant: quibusque vivaria, armenta,*

Prosper. Alpin. de Medic. Ægypt. l. 1. *c.*8.

I know not what *Logick* Mr *Glanvill* read at *Oxford*, but 'tis *Ignoratio Elenchi* in him, to oppose what Mr. *Cross* might say about *Asia* as 'twas of old named, and bounded, and travelled over, with the *new* discoveries of *China*, *Japan*, *&c.* which rather constitute a fifth part of the world, then are included in *Asia*. That is *Asia*, which they imported that gave it the *name*, not what others affix to it. By the same Sophistry it may be said that the *former Kings* were not *Kings of France*, because *late Conquests* have enlarged the *borders*.

Nor was *Aristotle* implicitly guided by the *relations* of those *Hunters*, *&c.* he diligently inquired into their reports, and oftentimes refutes the *vulgar stories*. See this particularly asserted by *Federicus Bonaventura* de partu Octomestri l. 5. c. 69.

menta, alvearia, piſcinæ, aviaria in cura erant: nequid uſquam gentium ignoraretur ab eo: quos percontando, quinquaginta fermò volumina illa præclara de animalibus condidit.

Let a man now conſider the greatneſs of *Alexander*, the impatience he had to effect his purpoſes, how *generous* he was in acknowledging Services, and how *vindicative* when neglected, and how underſtanding to know what was done and omitted: Let any man conſider this, and he will think that *the Society* have not a Patron that intereſſeth himſelf ſo much as *Alexander* did for *Ariſtotle*. He had ſeveral thouſands commanded to give him intelligence: their number tranſcends any that ours can pretend to: their *quality* is ſuch as the *R. Society* wiſheth for, *viz. Intelligence from the conſtant and unerring uſe of Experienced men, of the moſt unaffected and moſt unartificial kinds of life.* And if notwithſtanding all theſe circumſtances *Ariſtotle* were abuſed or miſtaken, or defective in his Narrations, I am confident there is leſs credit to be placed in the Narrations of ſome of our *Virtuoſi*, who have been ſo miſtaken in their Accounts of *Cider* and *Salt-Peter*, domeſtick Enquiries; what man will give himſelf the trouble to inform *them*, either at home, or abroad? with what *negligence* and *imperfectneſs* will they regiſter things? how *un-philoſophical* will their memoires be? How will they be able by intreaty to procure a *ſecond information*? That there are more parts of the *world* diſcovered and ſailed unto then in *Ariſtotles* time, I grant. But what certainty ſhall we have of *Narratives* picked up from *negligent*, or *un-accurate Merchants* and *Seamen*? What judgement have theſe *men of no reading*, whereby to *rectify* or *enlarge* their *Enquiries*? Mr. *Glanvill* doth not ſo much as know who writ well upon the ſeveral *ſubjects*, in which he pretends that the *Moderns* have out-done the *Ancients*. As Improvers of the *Hiſtory* of *Bathes* (by the way we are far inferiour to them in the practice of *Bathing*) he reckons *Savananla* for one: he might as well have recounted *Bayrus*, *Gordonius* and *Gatinaria*: or any of the *barbarous Phyſicians*, for advancers of the *practick*: He might have told us of a Volume of Writers *de balneis*: But why did he omit *Soli-*

Mr. Sprat. p. 257.

nander

nander de thermis, *Libavius*, and our Dr. *Jordan* (who lived at our *Bathe*) and *Bauhinus de fonte Bollenſi*, and the other Writers about particular *Bathes*? Alas! *He* knew them not: nor did I ever hear any man commend *Blanchellus* upon that ſubject. About Minerals, could he not have named *Encelius*, *Cæſalpinus*, *Fallopius*, and *Lazarus Erkerus*, whom I find by ſome to be preferred before *Agricola*? In his Account of remote *Hiſtories of Nature*, could he remember the Author of the *Caribby-Hiſtory*, and paſs by *Carolus Piſo*, *Burggravius*, and *Bontius* about *Braſile* and the *East Indies*. So where he ſpeaks of diſcoveries made by *Microſcopes* (pag. 57.) by naming *only* Dr. *Power* and Mr. *Hooke*, ingenious *Mechanicks*, Members of the *Royal Society*; he ſeems to intimate, as if none but the *Virtuoſi* had proceeded in that *adventure*, whereas *Petrus Borellus*, Phyſician in ordinary to the King of *Erance*, publiſhed a Century of *Microſcopical* obſervations *An. Dom.* 1656. ſuch as have (if true) more of *utility* then thoſe of Mr. *Hooke*, though leſs of *curioſity*, and deſtitute of *Cuts*; and *Kircher* after many years employed in thoſe contemplations, *per exquiſitiſſima Microſcopia*, did publiſh ſeveral Experiments of *that kinde*, in his book *de Peſte*; and *Nicolaus Zucchius* about the ſame time (1656.) publiſhed a ſhort account of *Microſcopical* obſervations, about a *Lowſe*, *a Flea*, the feathers of a *Peacocks tail*, &c. encouraging others to proſecute the *work*. He tells us, (*pag.*56.) "*that the diſcoveries by* Teleſcopes *may inform us* "*of the* Longitudes: *upon which* muſt needs *enſue yet greater* "*improvements of* Navigation, *and perhaps the diſcovery of the* "North-weſt *paſſage*, *and yet* unknown South. I grant that the *invention of Longitudes* will be extreamly beneficial to man-kinde in point of *ſailing*: and the *R.S.* have made great boaſts how that it ſhall be atchieved by their *Members*; and thereupon cauſed ſome projects to be rejected, which yet perhaps would have proved as *unfeaſible* as the attempt of *Galileo's*, to calculate it by the *Medicean Starrs*. I deſire much to ſee the happy reſult of our *Virtuoſi*, though the conſequences here affixed to *it*, as *Improvements* was very *defective*. I ſhall propoſe ſome Scruples about the *North-weſt* paſſage, and

Kerch. de Peſt ſect. 1. c. 7.

Nic. Zucchius Philoſ. optic. part. 2. tr. 3. c. 7. ſect. 4. p. 348.

and the *utility* of its discovery, as also of the hopes of finding out the *Southern Tracts*.

First, I say that the story about the streights of *Aman* is very *improbable*, if not certainly a *Fiction*. It hath been so thorowly search'd into by our *Nation*, that there is no encouragement to a further trial: and this Streight of the *North-west* passage, is indeed nothing but a narrow difficult passage to *Button's* Bay, the entrance being properly called *Hudson's* Streight, in regard of his first finding it; the mouth whereof lies in 62 degrees. But were there such a *passage*, it would much more concern the *Portugals*, and the *Spaniards*, and *Dutch*, then it doth the *English*; for their trade is to the *North-part* of the *East-Indies*, and ours to the *South*: theirs to the *Moluccoes*, *Philippinas*, *Japan*, and *China*; whereas we seldom pass beyond *Bantam* in *Java*.

See Mr. *Gardiner* in his description of *America* c. 25. where he professeth to write nothing but what his *own knowledge*, or *good intelligence* perswaded him unto, he having lived long in the remote parts of *America*: the loss of whose *large Account* thereof we may deplore.

Secondly, were there a *passage* that way, yet it were not to be chosen before the other: for, could a man sail in a *strait line*, first from *England* to the *Streight*, and thence from the *Streight* to the *East-Indies*, it would prove a *further* way then the other by the *Cape of good Hope*. But those that know any thing of those Seas, know that the Sea-Course to any part of *North-America*, is as low as 23, 24, 25, or 30 the highest by reason of the *winde* which bloweth in the *South-sea* East and West, as well as in the North, that is to say, for the most part *West* without the *Tropicks*, and almost constantly *East* within *them*. Wherefore you must go out of your way as well from the North-part of *America* to the *East-Indies*, as from *England* to this supposed *Streight*: and there is as much difference in relation to pleasantness in the Voyages, as between *Summer* and *Winter*. For when one is clear of the Bay of *Biscay*, in all the Voyage by the *Cape* you find no *cold* weather till you return to the same place again: but on the contrary, it is so cold and Icy about the *Streight* in the middle of *Summer*, that there is no making way without much difficulty and trouble. And in the *South-Sea*, where the *Sunne* keeps the same course as in the *North* in *June*; Sir *Francis Drake* in compassing the world, found so much cold in thirty eight degrees of North-latitude,

Judge hence what hopes there is of making discoveries in the *Southerne Tracts*.

tude, that he was forced into a *Southerly* course. Besides, if we may take a conjecture from the *windes*, which have blown when the Undertakers for that discovery passed into those *Streights*, one would guess by their *great coldness*, that they did *blow from the Land*, and consequently that there is no Sea to the *North* of *America*, but that the Land of this *New World* reacheth by the *North* parts, even to the *North*-wardly Provinces of *Tartary*, &c.

I am surprized to finde, that Mr. *Glanvill* doth not make the *Moderns* to surpass the *Ancients*, in *Architecture*, *Sculpture*, *Picture*, and several other Arts of *ingenious Luxury*. That he doth not advance the glory of our *Mathematical* burning-*Glasses*, above the *Specula Ustoria* of *Proclus*; and the Artificial Fires of our *Virtuosi* above those invented by *Callinicus*, when he burned the *Saracens* Fleet.

But not to upbraid *him* with what he hath omitted: I shall resume the discourse about *Telescopes*, and their *fallaciousness*, wherein if Mr. *Gross* was a little *doubtful*, yet Mr. *Glanvill* is so *assured*, that *he* makes an *ample recital* of the *contest*, and the advantages he gained in it. I shall set down his words, the better to divert my *Reader*, and to shew how insupportable such kind of *men* are in all *judicious* and *intelligent* company.

Mr. *Glanvills* Plus Ultra, c. 9 p. 65.

"To my Discourse about the *Dioptrick Tubes*, the *Telescope* and *Microscope*, the **Reverend Disputer** replied, [*That "our Glasses were all deceitful and fallacious*] Which Answer "minds me of the *good Woman*, who when her **Husband** "urged in an occasion of difference, [*I saw it, and shall I not "believe my own Eyes?*] Replied briskly, **will you believe "your own Eyes before your own Dear Wife?** And it seems "*this Gentleman* thinks it unreasonable we should *believe ours*, "before his *own dear Aristotle*.

"For an assurance of the *credit* of those *Glasses*, I told him "he might *try* them upon *objects near*, and *easily visible* by the "*unassisted sight*; and if he made the *trial*, he would finde "they *altered* the *objects* in nothing but their *proportions*, "which are represented *larger* for the advantage of *vision* in "things *small* and *remote*; and we have all the like reasons to

distrust

" *diſtruſt our Eyes*, as theſe *Glaſſes* (for their *informations* " are the *ſame* in all things, but the *mentioned difference*) and " there is no man ſo much a fool as not to make allowances " for *that*. Never was any yet ſo groſly deceived by the *Micro-* " *ſcope*, as to be perſwaded that a *Flea* is as *big* as a *Lobſter*; " nor did the *Teleſcope* ever make any one believe that the " *Moon* was at the *end* of his *Tube*: But if the *former* repre- " ſents that *little Creature* as *briſtled* and *jamar'd*, and the *o-* " *ther* makes the *Planet mountanous* and *uneven*, we have no " reaſon to believe but that their *reports* are *ſincere*, though " our *unaided* Senſes are too *groſs* to perceive either the one " or other; ſince, if the mentioned *briſtles* and *jamars* are " in the *Glaſs*, and not in the *Animal*, they would appear in " like manner in all the ſmall Creatures which in the ſame " light and poſition are look't on through the *Microſcope*: " And if the *ruggedneſs* of *ſurface* were in *it*, and not in the " *Moon*, the *ſame* would be ſeen upon all other *diſtant Ob-* " *jects*, that are view'd through the other *Optick Inſtrument*. " And if there be *deceit* in thoſe *Glaſſes*, Seamen had need " beware how they truſt them, ſince the *Flags* which appear " to be *thoſe* of their *Friends* in the *Perſpective*, may be re- " ally the *Colours* of their *Enemies*.

" Upon theſe Accounts, Sir, which afford *plain* and *ſen-* " *ſible* evidence, I wondred much at the Diſputers *ſtrange* " *ſuſpicion*, which had been ſcarce *pardonable* in a *vulgar* head; " and I know not what to call it in *one*, that would be " thought a *Philoſopher*: But the *wary* man gave a *reaſon*, " which made me as much *wonder* at his *Argument*, as " his *Doubt*. And to *this* attend Ye *Philoſophers* of the *ROY-* " *AL COLLEDGE*, and prepare your ſelves to anſwer a " *Demonſtration* from *Experience* againſt your *Glaſſes*; Raiſe " your *Expectations* for a *wonderful*, *convictive Experiment*; " Let the *Mountains travel*, and the *Birth* will follow. [*Take* " *two* Spectacles (ſaith the Experimental Sage) *uſe them* " *at the ſame time, and you will not ſee ſo well as with one ſingly.*] " therefore your *Microſcopes* and *Teleſcopes* are *Impoſtors*. " This man, Sir, is a *Logician*, and no doubt you *perceive ſo*. " O how I admire this *rare faculty* of *arguing*! How *dull* are

" our *Wits*, to thoſe *ſubtile*, *Eagle-ey'd Schoolmen*, who ſee " *Concluſions ſo far* off, through the more *unerring Teleſcopes* " of their own piercing Underſtandings? Did ever *old man* " before make *this* uſe of his *Spectacles*? But to leave won- " dring, let's endeavour to underſtand this *Philoſophy* of " Chue. How a man may *ſee* by *Spectacles*, that *Perſpectives* " are *deceitful*. [*We can ſee better through one pair, than two*] " ſaith the deep Philoſopher. Moſt *ſagely* obſerv'd! The " Argument *begins ſtrongly*: But in the name of *Ariſtotle*, " whence comes the *Conſequence*? *Therefore* Perſpectives *are* " *fallacious*.

" *One* Propoſition *for* Sence,
" *And* th' other *for* Convenience.

" This fits his purpoſe to diſcredit *new Diſcoveries*, 'tis no " matter how it follows. This Gentleman, you muſt know, " Sir, uſeth to have his *word* taken among his *admiring Neigh-* " *bours*, and ſo is not wont to be put to the *trouble* of *pro-* " *ving*: but I was ſo *unmannerly* as to expect *it*, chuſing ra- " ther to *ſee* with mine own *Eyes*, than his *infallible Spe-* " *ctacles*. *We can ſee better*——ſaith the Diſputer. How " doth *he* know *that*? If *Perſpectives deceive* us, though " *naked ſenſe* witneſs for them, Why may not his *ſingle Spe-* " *ctacles* be as *deceitful* as *they*? *Theſe* repreſent things *big-* " *ger* than they *are* to the *unaided ſight*; and the *Philoſophi-* " *cal Glaſſes* do but the *ſame thing*, in a *higher degree* of " *magnifying* the *Object*. But we allow him the benefit of " his *ſingle Spectacles*, though he will not be ſo courteous to " our *Glaſſes*, and confeſs his Reverend Experiment of the " *uſe* of *two*, but are *inquiſitive* about the *Conſequence*. The " *Reaſon* of which certainly *muſt be*, (if any be intended in " it) that our *Teleſcopes* and *Microſcopes* have a *Glaſs* at each " end, which the Man of Science thinks anſwers the two " pair of *Spectacles*, and therefore muſt render the *Repre-* " *ſentation deceitful*. If this *Philoſopher* had ſpared ſome of " thoſe thoughts to the *profitable* doctrine of *Opticks*, which " he hath ſpent upon *Genus* and *Species*, we had never heard

" of

" of this *Objection*, which is as much a reason against the *credit* " of all *Perspective Glasses* whatsoever, as the *Philosophical* " ones he would discredit. And without more *Opticks* than " those of *natural Understanding*, he might, if it had pleased " him, have known, that we *see better* through the *two Glas-* " *ses* in *Perspectives*, then any *single* one; because they are " so fashioned and ordered, that the *visive rays* are better ga- " thered and united by them for the advantage of sight: But " in the *two Spectacles*, the case is contrary. These things " I suggested, and some others from the *Dioptricks*, in which " this Sage Person was pleased then to conceal his Know- " ledge; and how great *that* was in these matters, will ap- " pear by the *Learned Problem* he proposed at this period of our Discourse, [Why we cannot see with two pair of Spe- pectacles better than with one singly? For, saith the Man of a Xioms, *Vis unita fortior?*] A *pleasant* piece of *Philoso-* " *phy* this; And I'le shew the Disputer how strongly he in- " fers from his *Maxim*, by another Question like it. Why " cannot he write *better* with *two Pens* then with a *single one*, " since *Vis unita fortior?* When he hath answered *this Quære*, " he hath resolved his own. I said in the Discourse, That " the reason he gave why one would expect it should be *so*, " is the reason why 'tis not; and this is plain enough to " *sense*, from the *confusion* of *Vision*, which shews, that the *rays* " are *not united* after the way requisite for the aiding the " sight (as I just now intimated) and how that should *be*, I " had here shewn, but that I am ashamed to adde more in " *earnest* about a grave *foolery*.

Upon this Discourse, the first *Remark* I shall make is, That Mr. *Glanvill* hath *little* or *no* insight into *Opticks*, and is in a manner as ignorant in that *profitable Science*, as he represents his *Adversary* to be. It is *something* for a Man to be able to give an account how he spent his time, though about *Genus* and *Species*; rather then to appear to have *idly* pass'd it away, without acquiring *any knowledge at all*. The Solution of Mr. *Cross*'s fallacy, (if it were *his*) by that Intergatory, *Why cannot he write better with two Pens, then with a single one?* is ridiculous, since there is no *vis unita* there: and

and in one ſort of *Tubes*, though the *rays* be *united* in the firſt *convex-Glaſs*, and brought to a *Convergency*, yet muſt the *Spharical Cavity* of the next *Glaſs* dilate again, and diſpoſe them *fittingly* to effect the expected *viſion* in the *Retina*: and beſides this, it is requiſite that the Tube be ſo *fitted* unto the *eye* (not to ſpeak of the *fitting it differently* according as the *Medium* is) as to exclude all other *impreſſions* and *radiations*, that may *divert* and *impede* the *ſight*, viz. *Ad conſulendum ſufficienti determinationi potentiæ per languidiorem & anguſtiorem impreſſionem à remotioribus, multum prodeſt, ſi ex forma inſtrumenti & ejus applicatione ad Oculum vel ex conditione loci è quo per inſtrumentum remotiora, & in minori amplitudine apparentia proſpectamus, impediuntur radiationes aliunde intra oculum ſimul & ſemel diffuſæ, præſertim validæ.*

Vitrum Sphæricè earum, dilatando radios per ipſum tranſmiſſos amplificat notabiliter imaginem ſi in debitâ diſtantiâ conſtituatur poſt Sphæricè convexum. *Zucchius phil. o t part.2.tr.1.c.7 ſect.5. pag.* 360,361,362. How it is in *Teleſcopes* made up of all *convex-Glaſſes*, the ſame Author ſhews there: and ſo doth *Kepler* in his *Dioptricks*.

Zucchius phil. ſ.opt. part.2. tr.3.c.7.ſect.5. p.338.

As to what Mr. *Croſs* is ſaid to have argued againſt *Teleſcopes*, that the addition of *one Glaſs* to *another* muſt *hinder* rather then improve *viſion*, becauſe that the ſuperadding of *one* pair of *Spectacles* to *another*, rather *weakens* then *amends* the *ſight*. I *muſt* ſay, that whoſoever underſtands the *forming of an Argument* cannot except againſt the *form* of that, nor do the *Propoſitions* cohere ſo ill together, as that one ſhould be as it were *for ſence*, and other, *for convenience*. All that excurſion of our *Virtuoſo* ſhews *his Ignorance*, not Mr. *Croſs*'s. 'Tis one thing to except againſt the *form*, another thing to except againſt the *matter* of a *Syllogiſm*. I confeſs there is *reaſon* enough for to do the *latter*; but now for the *other* procedure. *I* believe ſuch a *diſpute* was never heard of ſince the declining of *Arcadia*, as this was: If Mr. *Croſs* did urge this otherwiſe then to try the *Intellectuals* of Mr. *Glanvill*, (concerning whoſe *inhability* he might be *well ſatisfied*) there is no defence to be made for *him*, otherwiſe then that he was unacquainted with a *ſort of knowledge* which is *unneceſſary* in a *Divine*, and not expected from *him*; whoſe *credit* is better ſupported by thoſe *Qualifications* which repreſent *him* as a man of *godly Converſation*, *faithful* and *able*

in

in the discharge of his *Gospel-Ministry*. But that Mr. *Glanvill* as little understood the *subject* of a *knowledge he pretends unto*, it is manifest from hence; that he might easily have denied the Assertion of the *Spectacles*, that *two pair* did not *impede*, but *amend* the *sight* in *some eyes* that are *very weak*. I know a young Gentlewoman that hath two *Cataracts* breeding in her eyes, which *reads* and works with *two pair of Spectacles*, whereas she cannot with *one pair*. There is also an old Gentlewoman of my acquaintance who useth the *same helps*. I am ashamed to debate *these fooleries* (as our *Virtuoso* calls *them*,) but if Mr. *Gross* did call in question the *integrity* of the *Telescopes*, I shall assume the liberty of a digression about *that Point*, which perhaps may not seem *unseasonable* in *this Age*, and which will abate the *pride*, and evince the great *ignorance* of Mr. *Glanvill*.

Either my Memory doth very much deceive *me*, or else the Lord *Bacon* did suspect these *Telescopes*, that they might *impose upon our Senses*: and I am sure Mr *Boyle* is in the same Errour with Mr. *Gross*, for *he* complains that when *He* went about to examine those appearances in the *Sunne* called *Maculæ*, and *Faculæ solares*, he could not make the least discovery of them *in many months*, which yet other *Observators* pretend to see *every day*: yet doth Mr. *Boyle* profess, that *He* neither wanted the conveniency of excellent *Telescopes*, nor omitted any *circumstance* requisite to the *Enquiry*. Besides these, *Scipio Claramontius*, he that baffled *Tycho* about the *Comets* in the judgement of most men, and gained advantages enough against *Kepler* and *Galilæo* to make himself *glorious*, and to shew that instead of *Mathematical demonstrations* they proceeded upon *uncertain Topicks* and *Probabilities*: this learned and *inquisitive* person doth avowedly suspect the *Telescopes* as *fallacious* more then once, and that there are more then *He* of *that judgement*, is a thing unquestionable by any but *Superficial Scholars*: nor do *I* apprehend any *other reason* then *this* to be in their

Tentam. Physiolog. pag. 144. 145, 146.

Vide *Ricciol. Almagest.* nov. l. 8 sect. 1. c. 16.

Scipio Claramontius in defensione *Anti-Tychonis*, & libri de novis stellis à se conscripti Italico idiomate editâ, multis contendit Telescopium in repræsentatione objectorum fallax esse, *Part.* 2 *c.* 15. ex quibus infert c. 16. ei qui velit apparentias cœlestium per illud exceptas ratas haberi, necessariò ostendendum esse à nullâ aberrationum, quibus illud obnoxium est, hujusmodi niriatas esse. Quare cum ex una parte assumi nequeat, quasi universaliter verum quicquid per Telescopium repræsentatur; ex alia

heads

parte non possit talis propositio universalis restringi ad apparentias cœlestium, sine manifestâ *petitione principii*. cum hoc ipsum sit quod controvertitur; *an fallaci de se instrumento observata in cœlestibus pro certis habenda sint?* manifestè sequitur nihil ex usu Telescopii constitui posse de dispositione cœlestium. *Zucchius Philos. opt. part.* 1. *c.* 17. *sect.* 2. *p.* 175.

heads, who have till this day employed their thoughts here to contrive new *Glasses*, and *amend* defects in the former. Our *Virtuosi* have complained of an *Iris* in their *Glasses*, and gone about to cofrect that by *Turning of them*; but a *friend* of mine writes, that *he* imagines it was after that *Eustachio Divini* at *Rome* had given them an *hint of it*: and then they *found it out*. A little more modesty in *Assertions of this kinde* would become our *Wits*, considering that affairs of this nature (it is the opinion of *Archimedes*, and refers to all *Mechanismes*) admit not demonstration. *Cum neque visus, neque manus, neque instrumenta per quæ experiri oportet, satis habeant fidei ad exquisitam demonstrationem.*— Archimed. in libro *de Arena*.

I shall not so far engage in the controversie, as to repeat the *Arguments* and *Replies* on both sides. It seems *strange*, that the Telescopes should so *magnifie* thirty, fourty, or one hundred times *objects on earth*, and yet lessen those of the *fixed Stars in Heaven*, viz. *Stellas primæ magnitudinis*, Caniculam, &c. Jovem, Saturnum *minores repræsentat multo, quam oculo libero appareant*: *& idem instrumentum* stellas nusquam apparentes, *ut* Jovis Satellites *justæ magnitudinis repræsentat, & paulo minores repræsentato* Jove, *imò tantas facit, ut possint pius apparere, quam queant apparere stellæ primæ magnitudinis,*— *at quid? in Octava Sphæra stellas nihil apparentes magnas facit, Nebulosas scilicet, & Galaxiæ formatrices.*— This is granted all by *Galileo* to be *true*, but he solves by an imaginary *irradiation*, the fancie whereof he advanced upon some weak *Experiments*, most whereof he deserted himself, and the rest are excellently refuted by *Zucchius*, who introduceth another *Salvo* from the *configuration* of the *Eye*, and that part of it called *Uvea*: which perhaps may be discovered to be as *false* as any of the other hereafter: but he adds, *Ex quo est, ut in facilitate detrahendæ circumfusæ sideribus radiationis sit notabile discrimen inter Planetas collatos inter se, & inter stellas fixas invicem, & aliquas earum cum aliquibus eorum comparatas.*

Scipio Claramont. de universo l. 9. c. xxi.

Vide *Scip. Claram.* de universo l. 9 c. 17. 18, 19. 20 *Zucchius* phil. opt. par 1. c. 17 sect 6 p. 111. Id. ib p. 116.

ratas. Thus the Objection in its full force is granted by all (except *Sorsius* deny it) only the cause of the *Phænomenon* was not till *Zucchius* (if then) sufficiently explicated; Sure I am that *he* in another place avows, that long *Telescopes* rightly made do not lessen *Jupiter*, but represent him *greater* then He appears to the *naked Eye*: insomuch that his *Tube* of 23 feet-long did represent *Jupiter* as big as the *Moon* is when at *full*, and looked upon without any *Telescope*: so that He says the *Objection* holds only in *Telescopiis brevioribus, in quibus pariter evenit inspiciendo lucida inferiora.*

Zucchius phil. opt. part. 1. c. 15. sect. 5. p 199, 200.

Besides, were there such certainty in the *Telescopes*, how comes it to pass that there is such a *variety of opinions* amongst those *Observators*, whose *diligence* can be as little suspected as their *learning*? *Claramontius* did set two persons to observe the *Spots of the Sunne*, (both were inclined to *Novelties*) they were not 40 miles distant, yet did not their *Schemes* agree as to *number*, or *scituation*. Nor is this a *figment* of that partial *Peripatetick*: any man that reads *Ricciolus*, and *Zucchius*, will see that they cannot agree about the *number*, the *motion*, the *scituation*, or so much as colour of *them*. The words of this last *Writer* are very remarkable in reference to Mr. *Glanvill*, and that certainty which *he* asserts unto the *Telescopes*, viz. *Neque obstat discrepantia numeri, vel figuræ macularum in observationibus plurium, circa idem tempus captatis: tum quia longiores Telescopii in ampliori disco plures exhibent, quæ spectantem breviore Telescopio, angustiori disco latent: immo eodem Telescopio, ad exactam mensuram suæ extensionis redacto, notabiles fiunt aliquæ, ante inobservatæ: & facillimum est in tali mensura minus exercitatos decipi; cum tam pauci ex observatoribus, nec nisi monente* Scheinero, *didicerint ad exacte consignandam Solis imaginem, & in ea maculas, per trajectionem radiorum Telescopio in planum directe oppositum, necessariam esse mutationem extensionis Tubi, eo notabiliter magis producto in hyeme, correpto in æstate: Tum quia sicut facilis est, ex allatis varietas in numero macularum, ita in terminatione, quæ facilius mutari potest ex iisdem capitibus in illis, quæ in pluribus observationibus consignantur, & ex modo consignandi.* Less do they agree about

Ricciol Almag. nov. l. 3. c 3

Zucchius phil. opt. par 1. c 7. sect 8. p. 233.

See this point of the *variety* about the *spots in the Sun*, particularly handled by *Schottus* in his Notes upon *Kircherus's Iter exstaticum cœleste. Itiner. 1. dialog. 1.* p 183. And now different the observations of *Galileo* and *Scheiner* were you may see in a *Synopsis* in the *Rosa Ursina l. 1. c. 4. & ib. c 10.*

about the *nature of them*: one *Joannes Jarde* named them *Astra Borbonia*: and *Malapertius*, *Mastrius*, *Rheita*, do hold them to be *Starrs*: of this opinion was *Scheinerus* once, but he afterwards assented to that of *Galilæo*, *Kepler*, *Bullialdus* and *Blancanus*, that *they were not Starrs*, but *fuliginous exhalations* arising out of the *furnace* of the *Solar Globe*, which he conceives to be a *fire*. *Kircher* and others are of the same judgement; but *Ricciolus* distrusts it, being not able to comprehend how *fuliginous vapours* should arise in *such a number*, so *constantly*, so *permanently* as to keep a *motion* about, or with the *Sunne*, of about 27 days.

Vide *Schottum* ubi supra, p. 184. *Ricciol.* Almag. nov. l. 3. c. 3 p. 57.

The like *uncertainty* there is in the *Observations* about *Saturn*, *Jupiter*, *Mars*, &c. what controversies do they raise and how contradictious are their *Relations*? *Galilæo* doth represent *Saturn* in one figure, *Scheiner* in another: the former saith, that the *oblong* shape in *Saturn* ariseth from a defect in the *Telescope*, or *Eye*, that could not distinguish the *Comites Saturni* from the *Planet* it self. But *Ricciolus* and others dissent from *him* in *that point*: and *Christianus Hugenius* made observations about *Saturn*, such as neither *Antonius de Rheita*, nor *Hevelius* did ever see; and represents the *ansulæ* of *Saturn*, differently from what *Fontana* and the *Dantiscan Selenographer* do write. The words of *Hugenius* I shall propose to Mr. *Glanvill's* consideration, *Expectamus ut sub finem* Aprilis, *si non antea, brachia Saturno renascantur*, non curva illa, *cujusmodi a* Francisco Fontana, & Hevelio *depicta cernuntur*, *sed* secundùm lineam rectam *utrinque prominentia*, siquis melioris notæ perspicillo intueatur. *Nam* vulgaria si adhibeat *binos orbiculos referent*, *sicuti* Galilæo *primum se obtulere*. *Nostram quo* Saturni *asseclam reperimus*, *quinquagies diametrum rei visæ multiplicat*, *duodenos pedes æquans*; *cui postea duplum longitudine constriximus*, *multiplicatione centupla*. *Cum autem* longiora etiam hisce Telescopia, *utpote triginta & quadraginta pedum ab aliis fabricari dicantur*, *aliquid aut vitris vitii inesse*, *aut hæc eadem non debita proportione mutuo respondere credibile est*. *Neque enim alius hucusque aciem eorum effugisset novus* Saturni Satelles. Being to speak of *Saturn*, I must not forget *Zucchius*, who after

Galilæo in ep. ad Velserum, citante *Claramontio* de univers. l. 9. c. 9. *Ricciolus* Almag. nov. l. 7. sect. 1. c. 2. p. 487, 488. *Schottus* in *Kircher.* iter exstat. cœleste p. 301, 302. *Christ. Hugenius* apud *Borellum* de conspicinis, p. 63.

after *thirty five years* diligent obſervation with variety of the beſt *Teleſcopes*, repreſents this Planet *differently* from what any others write, viz. *Aſſero Saturnum multorum annorum ſpatio figura paſſim oblonga, & in oppoſitione ad Solem, notabiliter majorem apparuiſſe, in apparentiæ medio viſum eſſe album illuſtre tumidum, aliquo modo ad rotunditatem vergens, accedentibus hinc inde ad illud duabus velut nigris notis, quas altum illuſtre, totam apparentiam ad apices terminans ita includit, ut ad apices illius multo ſit craſſius, ubi vero eas notas complectendo ad medium extenditur, gracileſcat.* Zucchius philoſ. opt. parr. 1. c. 17. ſect 5. p. 200, 201.

Aſſertio eſt facti, in quo a multis jam, annis conveniunt accuratiores, ex variis Provinciis obſervatores longioribus Teleſcopiis inſtructi.

Scio a prioribus vulgatum, tres a ſe ſtellas in loco Saturni *ſpectatas, media multo majori, quæ ſimul mutantes in cœlo ſitum, a fixis aperte diſtinguerentur, & Saturni duobus Planetis minoribus ſtipati apparentium exhiberent, qui poſtea, illis a tali ſitu motis ſpectatus ſit figura rotunda. Verum triginta quinque ut minimum, anni ſunt, quibus figura ſemper oblonga, cum diſpoſitione in aſſertione aſſignata, a me ſpectatus eſt pluries quotannis, pro vario ad* Solem *ſitu,* acutioribus, minus acutis, cavis, convexiſque *lentibus ad oculum proxime in Teleſcopio adhibitis apparentia eadem, ſemper magis diſtincta, & majori, in oppoſitione ad Solem, etiamſi meliorem vitiorum elaborationem in multo longioribus Teleſcopiis poſtremo* D. D. Evangeliſtæ Torricellii, & Euſtachii Divini *artificio, & beneficio ſingulari conſecutus ſim.—Quare in hoc* priorum obſervationes, *qui* brevioribus, *minuſque perfectis Teleſcopiis, ut omnino ratas admittere non audeo.*

Concerning *Jupiter*, and his *Satellites*, and their *number*, taking in the *Urban-Octavian* Starrs, I finde a great variety, even when two men obſerved at the ſame time, as *de Rheita* and *Gaſſendus*: that both of them *were in the right*, cannot be ſaid: which of them were in the wrong, I know not. In ſumme, the obſervations about *Jupiter* and his *Attendants* are ſo various, *Aliter enim apparuerunt* Simoni Mario, *aliter* Apelli, *aliter* Galilæo, that *Claramontius* takes *this advantage* of it. *Ego igitur argumentum ex ejuſmodi diverſitate alicio* Vide *Schottum* in *Kirch.* iter exſtaticum cœleſte p. 268, 269. &c. *Riccioli.* in Almag. nov. l. 7. ſect. 1. c. p. 485.

Scipio Claramontius de universo l. 5. c. 8.

contra veritatem objecti, non contra observationum diligentiam, cum observatio ejusmodi non sit nisi pura per tubum transpectio, eaque defixa: ii etiam viri perfectum instrumentum habebant, estque id verisimile, cum in eam rem toti incumberent, instrumentum etiam exactum paravisse: oculorum etiam & visus acumen, cur demam Apelli & ejus in observando sociis, potiùs Galilæo *demerem, qui se fatetur oculum minus perfectum habere*

Neither are they better agreed about *Mars* and his *Figure*, the *umbo* or *spot* in him. *Gassendus* denies that ever he saw it, though he used the *Tube* of *Galilæo*; others avow it: as you may see in *Schottus* and *Ricciolus*. In fine, as to the new *Phænomena* about *Mars*, *Venus*, and *Mercury*, to defend them *Zucchius* is forced to complain of the *Telescopes*, and protests thus. *Interim te, amice Lector, provoco Spectatorem, bono & longiore Telescopio instructum, cujus Lens superior ad obtinendam figuram apparentiarum bene præcisam, juxta dicta, maxima ex parte contecta sit, modico ad medium aperto foramine.*

Scottus in *Kircher*. iter exstat. cœlest. p. 242, &c. *Ricciolus* Almag. nov. l. 7. sect. 1. p. 486. *Zucchius* phil. opt. part 1 c. 17. sect 4 p. 193.

I am tired with the further prosecution of this subject; and therefore shall confine the rest of my discourse to the *Observations* about the *Moon*: the contemplation whereof, as it is more *facile*, so it hath been more pursued then any other of that kinde. There is none of our *Comicall Wits* doubt that it is a *World*, divided into *Hills*, *Valleys*, *Seas*, *Lakes*, *Rivers*, and even *peopled* as this *Terraqueous Globe* of ours But it is remarkable, that the use of the *Telescope* hath not convinced *some*, that the *Moon* hath an *unequal surface*, but that the *Phænomena* of the *spots* may be solved by the conceit that some parts of it are more *Diaphanous*, some more *opake*. Who hath not heard how *Scheiner* looked on the *Moon* in an *Eclipse*, and did conceive it was *fistulous*, (at least *translucid* in part) and so did transmit the light thorough several *Cavities* in some places, whilst others, not *directly* subject to the *Sunne*, are *obscure*. They cannot agree whether the Spots of the *Moon* be *more bright*, or *obscure* in an *Eclipse*. The *observations* and *descriptions* of the *Moon*, made by *Galilæo*, *Scheiner*, *Fontana*, *Schottus* upon *Kircher*, &c.

Berigardus Circul. Pisan. de Luna. id. b

&c. are ſo *defective*, that we muſt repute them but as the firſt *rudiments* of an *intended* Science. And as for the deſcriptions of the *Phaſes* of the *Moon*, made by *Langrenus* and *Hevelius*, however there be many things in which they *all* agree: yet the *Teleſcopes* of *Ricciolus* (made by a *Bavarian* Artiſt) and of *Franciſcus Maria Grimaldi*, either rectified the *miſtakes*, or repreſented many *Phænomena* different from thoſe delineated by *Galilæo*, *Fontana*, *Torricellius*, and *Manzini*, viz. *Lunaris faciei partes omnes magnas, mediocres, ac minimas ſingillatim Teleſcopio intuens* Grimaldus, *eaſque ſtatim cum* Langreni & Hevelii *Schematibus comparans, deprehendit multa quidem egregie ab iis peracta, non pauca tamen ſupereſſe, quæ aut addenda, aut quoad ſitum, magnitudinem, figuram, ſymmetriam, nigroris aut claritatis differentiam corrigenda forent.* Such as reject the *exact Sphericalneſs* of the *Moon*, introduce *Aſperities* and *inequalities* in the *ſurface* of it, which ſome explain by *Mountains*, *Valleys*, and *Waters*: but concerning the parts of the *Moon*, which might be *Water*, and which *Land*, our *Obſervators* did differ. *Galilæo* believes the *ſpots* or *obſcure parts* to be *water*. *Kepler* held the contrary, that the *bright parts* were *water*, and pretends to demonſtrate it out of *Opticks*. though afterwards he changed his opinion for that of *Galilæo*'s, which is generally received. As to thoſe *aſperities* in the *ſurface* of the *Moon*, whether they extend to the *Limbus*, or utmoſt circumference, or no, is a doubt amongſt *them*: *Galilæo* denies it; *Kepler*, *Ricciolus*, and others affirming it: and the latter gives this reaſon why they are leſs frequently obſerved there: *Vera cauſa cur raro aſperitas illa Limborum videatur, eſt partim imperfectio Teleſcopii, &c.* Neither are they better ſatisfied about the *Atmoſphear* of the *Moon*: that there is: *one*, *Galilæo*, *Kepler*, *Antonius Maria de Rheita*, *Kircher*, *Cyſatus*, *Scheiner*, with others do avow: and *Langrenus* ſaith, that we may obſerve it with a *Teleſcope*: *eandem Tubo-ſpecillo conſpici affirmat* Michael Florentius Langrenus. But others *deny* it as peremptorily.

Ricciolus Almag. nov. l. 4. c. 7.

Glailæo ſyſtem. coſmic. p. 131. edit. *Lonain.* *Kepler.* Aſtronom. Optic. c. 6. ſect. 9.

Ricciolus Almag nov. l. 4. c. 8. qu 2.

Kircher. iter exſtat. cœleſt. p 48. *Ricciolus* Almag. nov. l. 4. c 6. ſect. 8.

Interim

Riccol. Almag.nov.l.4. c.2.sect.3. *Interim mihi* (saith *Ricciolus*) *nondum quocunque Teleſcopio adhibito aer hic ita patuit, ut illum potius prope ac circa Lunam, quam in aere noſtro, in quo & Halones fiunt, cogar agnoſcere.* And *Zucchius* at large proveth this Corollary, *Non elevantur vi luminis Solis vapores e Luna, ſicut elevantur ex Globo e terra & aqua integrato: Neque datur circa Lunam Sphæra vaporoſa ulla, qualis circa dictum Globum deprehenditur.*

Zucchius phil. optic parr.1. c.17. ſect. 9. p. 264.

Having proceeded thus far, I ſhall take notice of ſome *extravagant* opinions that poſſeſs many of our *Comical wits*, and their *Aſſociates* or *Admirers*, which are extended to the prejudice of *Chriſtianity*, and the growth of *Atheiſm* in this *Age, viz.* That the reſemblance betwixt the *Moon* and the *Earth* is ſuch, that it is a *Terraqueous Globe* inhabited by *men*, and they hereupon concern themſelves about their *Progeny, Salvation, &c.* I ſhall from hence take occaſion to inſtruct thoſe *phantaſtical* perſons, that even *Hevelius*, who accommodated the *Terreſtrial Geography* to the *Lunar Globe*, and ſeems to conclude that the *illuminated* part is *earth*, the *darker* is *water*: yet did it only becauſe He knew no fitter compariſon amongſt ſublunary bodies. —— *Non eſt autem quod quiſpiam ideo exiſtimet Lunam ex ejuſmodi ſabulo, luto, aut lapide eſſe compoſitam, ut hæc terra noſtra, ſiquidem fortaſſis ex alia poterit conſtare materia, ab imaginatione noſtra prorſus diverſa, & modo adhuc incomprehenſibili.* —— *Minime etiam haſce Lunares aquas noſtris ſimiles aſſero, ſed quod nihil quicquam ſimilius, propter magnam utrarumque affinitatem hic in terra habeamus, cum quo illas comparare valeamus.* It was *indiſcreetly* done of *Kepler*, *Kircher*, *Hevelius*, and ſuch Writers to carry on the compariſon ſo far, the reſemblance betwixt the *two Globes* being ſo little as the moſt *unprejudic'd* perſons findit to be. *Hevelius perinde acſi Luna eſſet altera tellus, Geographica noſtratis Telluris nomina in Lunam tranſtulit: licet quoad* figuram, ſitum, ſymmetriam, &c. nulla *fere ſit* Analogia *inter utriuſque ſuperficiem.* The truth whereof will further appear from thoſe *conſiderations* which the inquiſitive *Zucchius* after *thirty five years* uſe of *all manner* of *Teleſcopes* at length fixed upon, *viz. That the diſcrepancy of Parts in the illuminated Moon may be explained without*

Joan. Hevelius Selenograph. p. 148.

Ricciolus Almag. nov. l. 4 c. 7. p. 203.

Zucchius phil. opt. hart. 2. c. 17. ſect. 9. corol. 7. p. 266.

out attributing thereunto any variety of colours: yea, it ought to be so explained. The first part of which Assertion he proves thus: because in *Opace bodies* the difference of a greater and lesser Obliquity in their scituation towards the body that shines upon them doth cause a diverse manner of *illustration.* Thus the same wall, of one uniform colour, according as it is differently illuminated, seems in some parts to be *white,* in others *pale,* in others *dark-coloured,* and *black*: besides that, a greater or lesser *asperity* or inequality of the superficies may cause an intermixture of the *enlightned* and *over-shadowed* parts, and so create different appearances of *light* and *opacity* in their most *observable* parts.

The second part He proves thus: because that the face of the Moon being looked on with a *Tube* of an *extraordinary length,* with Glasses *excellently polished* (such as *He* used for many years) appears *all of it* like a great Tract of Land covered over with *Snow,* which the Sunne variously illnminates accordingly as the parts are differently framed and scituated. Where there is any change of scituation in the parts illuminated in reference to the body that irradiates them, then do such parts *abate of their whiteness*: and although they still continue in such a position that his beams may in some degree and manner reach them, yet by reason of the *unequal surface* of the *Moon* (in which some parts are more elevated then others) some parts are *directly opposite* to the *Sunne,* others are glanced upon with an *oblique ray,* and this mixture of *shades* and *brightness* occasions those spots which we so talk of. Thus upon the *libration* of the body of *Jupiter,* the *girdle,* which otherwise seems *remarkably black* above the other adjacent parts of the Planet, becomes like unto the rest of the body in *whiteness,* and so *disappears.*

As to the distinction of the Moon into *Sea* and *Land, consisting of Mountains and Valleys*; although the *Analogy* may seem *allowable* by reason of the *Asperities* in the *surface of the Moon,* (which is a thing not to be denied: albeit that the calculation of the *heighth of those more elevated parts* are ridiculous, except the *nature* of the *Cavities* were better

Existimo materiam globi lunaris non constare terra & aqua Galilaeo systema. cosmic p. 132.

to

to be discovered, as *Zucchius* shews) yet the imagination of *Seas* and *Lakes* therein, or any thing *of that Nature*, except what borders upon the *Peninsula deliriorum* in the *Lunar Chart* of *Ricciolus*, 'tis all an *improbable phancie*. For, that the *more pale* and obscure *spots* are not *water*, appears hence, that those *spots* keep the same *Phasis* or appearance for many days, though the *Site* of the *Moon*, both in respect of the *Sunne*, and of *us the Spectators*, do vary much in that time: whereas when the *Sunne* casts his *beams* upon *Seas* or *great waters* on *Earth*, the *Phænomena* differ according as the *Sunne*, or the beholder vary their *station*: And this alone might convince us, but that I finde now in *Zucchius*, viz *Similiter transitum successivum radiis Solis ad fundum usque ad magnis maculis intra margines illustriores contentis præbent* (ut diximus in apparentiis, pag. 239.) *quod non evenit in liquido profundo instar aquæ, ut in aquis experimur etiam in multa vicinitate illustratis, quando notabilem habent profunditatem: tum quia constantem inæqualitatem illustrationis exhibent in horizonte Lunari, & quidem, juxta dicta in Apparentiis* (num. 3.) *secundum magnam extensionem illustratam, intra reliquas partes nondum Solis radiis perfusas; imo aliquæ, Soli proximiores, alias sequentes in eadem majori macula inumbrabant: hujusmodi autem convenire non possunt corpori inconsistenti, & liquido aquam referenti, quæ tamen certum est convenire aliquibus Lunæ partibus, ab omnibus inter maculas computatis.* I must confess I think these *reasons* convincing to any persons not prepossessed; and they are much more inforced by *him* with a *discourse* concerning *exhalations* and an *Atmosphear* about the *Moon*, which he denies *absolutely*: yet considering the proportion of the *imaginary Waters* to the *Land* in the *Moon*, and the *heat* and *continuance* of the *Sunne-beams* thereupon, common reason would tell us, that the *vaporous exhalations* would *proportionably* exceed those about the *Earth* here, and produce an *Atmosphear* that should be *observable*, whereas the most accurate inspection at most opportune times with the *best Telescopes* could not satisfie *Zucchius*, that there was *any such thing at all*.

Zucchius phil. opr. part. 1. c. 17. sect. 9 p. 260, 261.

Zucchius ubi supra p. 263.

Galileo proveth, that in the *Moon* there is no rain; no *clouds* there thicken the air. *Longis ac diligentibus observationibus nunquam id animadvertere potui, ac semper uniformem purissimamque serenitatem ibi deprehendi. Galileo.* system. comic. p. 133. *Zucchius* ubi supra. p. 264.

Kepler

Kepler (and his Master *Mœstlinus*) did believe that the *Moon* was a *World* consisting of *Sea* and *Land*, making up one entire *Globe*, as the *Earth* does; and that the *Mountains* there were much higher and bigger *comparatively* then those of the *Earth*: and adds by way of *jocundry*, that since the *Men* and other *Animals* commonly participate of the nature of the *soyl* and *climate* they dwell in, that the inhabitants of the *Moon* must be of a *greater stature*, and *more robust constitution* then those of the *Earth*: The *Day* there making up *fifteen days* of ours: and the *Heats* seem so *scorching*, and so *unexpressible* by reason of the *Suns* being vertical to *them* so long. In fine, *he* thinks it no absurd opinion of the *Gentiles*, that made the *Moon* a kinde of *Purgatory for departed Souls*.

Kepler Astronom. Optic. c. 6. sect. 9.

Upon the most *serious consideration* of all circumstances, whereunto I could ever engage my thoughts; when I reflected upon the great difference betwixt the *Days here* and *there*; the different influence which the *Sunne* must have *here* and *there* through the Diversity of his Aspects, (whereupon depend *Terrestrial* productions) that there is no *rain*, no *clouds* there; no *Atmosphear* (like ours) proportioned to such *respiration* and *life*: no intermixture of *earth* and *water*: no *innate diversity of colours*, which occasion the *Phænomena* that perplex our over-curious Mortals: and that all the *Enquiries* hitherto made, have so little of *evidence*, that 'tis *more clear* that the

Galilæo (ystem. Cosmic. p. 137. *Existimo materiam Globi Lunaris non constare terra & aqua. Quæ res una ad generationes alterationesque nostris similes tollendas sufficit. Verumtamen etiamsi concederetur aquam ibi terramque dari; non tamen plantæ & animalia nostris similia nascerentur, idque ob duas præcipue rationes: primo quia ad nostras generationes aspectuum Solis varietas adeo necessaria est, ut sine illis esse nullæ possint. Jam autem habitudines Solis ad Terram, ab illis quæ sunt ad Lunam, valde differunt. Nos quoad illuminationem diurnam, in majore parte terræ, singulis horarum viginti quatuor periodis, noctis atque diei vicissitudinem experimur, quæ in Luna mense uno demum spatio absolvitur. Item itle Solis in Zodiaco descensus & ascensus annuus, qui hiemis æstatisque vicissitudinem & dierum ac noctium inæqualitatem producit, in Luna unico mense finitur: Cumque Sol apud nos sit elevetur ac deprimatur, ut inter maximam ac minimam altitudinem intercedat differentia gradum, 47. quanta nimirum est distantia ab uno tropico ad alterum; in Luna non nisi 10 gradibus aut paulo amplius illa differentia constat, quanta scilicet est maxima latitudo Draconis ultra citraque Ecliticam. Nunc consideretur qualis operatio sit futura Solis in Zona torrida, si per quindecim dies continuos radiis suis eam ferire pergeret. Per se enim intelligetur, omnes plantas, herbas & animalia posse ium itura. Quod si vel maxime generationes ibi fierent, illæ tamen ab herbis, plantis, & animalibus nostratibus diversissimæ forent.*

Secundo persuasissimum est mihi, nullas in Luna pluvias esse. Nam si qua parte nubes ibi congregarentur, ut fit in terra, videremus utique rerum illarum aliquid absondi, quas ope telescopii in Luna conspicimus: & in summa, in particula aliqua nobis variaretur aspectus. Id quod longis ac diligentibus observationibus nunquam animadvertere potui, ac semper uniformem purissimamque serenitatem ibi deprehendi.

Moon is a *Cheese*, (not *fat*, for then it would *melt*) odly figured and made with *Asperities* in its *Superficies* (and perhaps a *little vinnyed* in some parts) then an *Earth resembling ours*: I could not but condemn those our *Comical* and *Atheistical Wits*, who use so little of *modesty* or *scrupulousness* in their discourses about this *so uncertain subject*. They are men of so *little reading* and *inquisitiveness* (whatever they pretend unto; as if this Nation produced no persons equal to them for *Learning* and *Abilities*) that they never examined *these debates*; but the *opinions* which they take up and transform into *Assertions*, are onely the *raillery* or *casual* and imperfect *pieces of conversation* betwixt *more intelligent* persons, or some *Coffee house-talk*, which they confidently obtrude and *impose* upon *speculative* or *more considerate Gentlemen*, and render themselves insupportable in any Society.

A young *Gentleman*, a friend of mine, who was not a little valued in the world, who was no stranger to the *Mathematicks*, and whose *wit* and *learning* far transcended any thing I can observe in a *droll* and *Comediantes* of these times, entertain'd me with a discourse once of this nature; Having spoken of the Celestial *Phænomena*, how differently they were represented by *sundry men*, he was more prone to suspect their *dioptrick Tubes*, then *their integrity*: He thought our *Eyes* were *Telescopes* of *God Almighty's* making, and the model by which the others were regulated and amended: and that any man who regarded the *daily Occurrents in vision*, could never believe it possible, that any *certainty* could be derived from *Telescopes*, about such *Phænomena* as we could employ only *one sense* about, and that not in a *due distance*, and with such circumstances as *legitimate* the *judgement* thereof: That we were to look through *their different mediums* (granting that our *Air* makes but *one Diaphanum*) and those not contrived *dioptrically*, that we know, and that since every *medium*, *thicker* or *thinner*, (besides the intercurrencies of *irregular* and *unknown* particles, like to *moats* in and upon a Glass) did cause a *different Refraction*, and that neither the constitution of our *Atmosphear* (as not proportionate to our *sensible* enquiries) and *air*, nor the *intermundial Æther*, nor

Tubis lentibus duabus constans dici potest omnium mere artificiosus Scheiner. Rosa Ursin. l. 2. c. 7 quem vide ib. a c. 23. usque ad c. 30.

Tam varitas quam densitas potest esse causa refractionis. Meisenn.

nor the *Sphæra vaporosa* of the *Planets* could ever be *accurately* and *satisfactorily* searched into; no man could *particularly* know what he *beheld*, and deduce *with prudence* any *theoremes* and *conclusions* from such *infirm hypotheses*. He added, that *our senses* and the *daily objects* we converse with on earth, did *prejudicate* rather then qualifie us for *these speculations*: that we might easily observe what *mistakes* arise from the contemplation of *resemblances*: that *similitudes*, though very *slender*, engage the *unwary*, (and some that are cautious too) to conclude an *identity* in *objects*: that it would be impossible for any man without the aid of a *nearer approach*, and even of his other *senses*, to conclude whether a *stick* lying part in, part out of the *water* were *streight* or *crooked*, by reason of the *refraction* in the different *mediums* of *Air* and *Water*: and that a *Glow-worm*, or an *Indian fire-Fly* would create strange *disputes* and *contests* amongst mankind, had they no other helps to discover the *Phænomenon* then a *Telescope*, magnifying the *object* and its *parts* thirty, fourty, or one hundred times. He admired that saying of *Aristotle*, περὶ τῶν θεσπιῶν ὁμονοεῖν οὐκ ὄντι τὸ φιλιάς: and commended *him*, that in his doctrine of *Meteors* he pretended not to arise higher then a low *degree* of *probability*. That it was possible to imagine such things to our selves as were not really in the *Moon*, but not *such* as *were there*, except in a very general and *indefinite* manner. *Posse quidem excogitari nonnulla, quæ in Luna neque sunt, neque esse possunt: nihil autem eorum quæ ibi sunt aut esse possunt, nisi largissima generalitate.* That the appearance of an *Earth*, did not infer the *inhabitation of men*, much less *Animals* and *Plants* like ours: that our own *Geography* might undeceive us herein, some parts of *this Globe* being not *peopled*, and the *animals*, and *plants*, and *nature of the soyle*, differing so much from our *European* productions, as we *could not have conceived*, had not our *Eyes* and *authentick testimonies* gained us to a *belief* of it. That the most *clear* Eyes have in this case a kinde of a *suffusion*, and the most *unbiassed persons* their *Intellectuals prejudicated*, and had no reason to condemn the opinion of that Peasant, who imagi-

Arist meteor. l. 1. c. 4. sect. 2. These are the *words*, and this the judgment of *Gali. lxo Syst. Cosm. p.* 77. Ὁ περὶ τῶν μετεώρων ἢ τῶν ὑπὸ τὴν ἐλάττονος τάξεως, καὶ μᾶλλον ἀνθρωποειδῶς ἔχει, εἰ ἄν αὐτῷ τῷ λέγοντι, ἢ τοῖς ἀκούσασι δῆλα ἂν εἴη, εἴτε ἀληθέα ἐστὶν, εἴτε μή· ἀγαθὸς ὅτι τοῖς ὅπη χρὴ ἐπενεγκαντα διδάσκαλος τὸ σαφές. Hypocr. de vet med. sect. 3.

ned the *Grandeur of Rome* to be like unto his *Village*, or the *Scot* who represented *London* to be such another town as *Edinburgh*. It is an opinion wherein the *Peripateticks* and *Lyncei* are agreed: *Quicquid sub nostram cadit imaginationem, id aut jam ante viderimus oportet, aut ex rebus rerumve partibus jam ante visis compositum sit, quales sunt Sphynges, Sirenes, Chimeræ, Centauri, &c.* He smiled at those who thought they had much improved *solid knowledge*, by telling men of *Quasi-terra*, *Quasi-mare*, *Quasi-sylvæ*, which *he* supppos'd to be as insignificant termes as the *Canting* of *Chymists*, or the *Quasi-corpus*, and *Qu. S. sanguis*, in the gods of *Epicurus*: that it was intolerable in a *Philosopher* to *phrase* it thus, however a Poet might say,

Galilæo systema cosmic. p. 77.

Ἰχὼρ, οἷός περ τε ῥέει μακάρεσσι θεοῖσι

But nothing created in him a greater *laughter*, then the Propos'als some made of *flying to the World in the Moon*: this design he thought *superlatively* ridiculous, though the contrivance of *wings* for *mankind* were then but projecting at *Wadham-Colledge*: It did not appear to him then that *this World* was no *Magnet*: he wished that first these *Opiniatours* would go to both *Poles*, and placing themselves there try the Observations of *Des-Cartes* with some dust of *Iron*: that they would consider whether the more *remote Air* would bear up their *wings* and *weight*, (perhaps there might be that difference in *Air* that there is in *water*. where those *Ships* which *sail* in *salt-water* do sink in *fresh streams*) and how it might agree with their *respiration*, since the *Air* upon the tops of *Andes* of *Peru* is so sharp, that those Mountains are as difficult to pass, or live upon, as *Aristotle* represents *Olympus* to have been, where men are forced to breath through *Sponges*: whether that *inhability* of the *Air* for men to breath in it did arise from the *real nature* of so *elevated* a place, or that it was occasioned by some *destructive exhalations* (since Mount *Athos* is reputed higher then *Olympus*) he knew not: but he thought they might enquire well into this particular, and into those regions (which are different) wherein *storms*, *thunder*,

Vide *P. Alph. Ovag. ium* in relatione *Chilensi* c. 5. *Ricciol* Almag nov. in append. ad part. primam tomi primi, p. 739.

thunder, and *ſnow* are generated; what *tempeſts* might ariſe therein (of which we are not ſenſible here below) what *proviſion* there is againſt *them* before one arrives at the *twelve Celeſtial houſes*: what accommodation of *meat* and *drink*, what *money* currant in thoſe parts, all which ought to be regarded leſt our *Experimentators* ſhould come off as ill as the *Knight of the Mancha* did, when he had not wherewithal to defray the *expence* of his *Inne*: beſides that, he was much afraid, that at their arrival, agreeably to what *Kepler* ſaith, they might finde their *lodging* too *hot* for *them*.

Concerning a *voyage* to the *World of the Moon*, the *difficulties* of the *paſſage* and of the *air*, *water*, and other circumſtances there, read *Kircher* his *Iter extaſt.* unto the *Moon*; and you will find how juſt a *caveat* I give here.

Having ſaid theſe things, that *great young man*, (who died before that *Ignorance* and the *Virtuoſi* grew *prevalent*) preſented me with the works of *Marcus Aurelius Antoninus*, publiſhed by *D. Meric Caſaubon*, opening it at that place where that underſtanding *Emperour* acknowledgeth it to have been the ſpecial favour of the *Gods*, that he never troubled himſelf about theſe *Meteorologies* and *extravagant ſpeculations*, whereunto nothing *humane* can reach: He added, that in *theſe kind of ſpeculations* he knew *enough* that was ſecured from *ſuperſtition*, that for a man to deſert thoſe *Studies* which qualifie him for a *ſociable life*, and were of importance to the preſervation of the *Government* and *Countrey* he lived in, this was a kinde of *ſalvageneſſe*, had more of the *Anchorete*, then of *Civil Prudence*, and was to be encouraged in a *Cloyſter*, or in the deſerts of *Thebais*, then to be made a practice among *wiſe Stateſmen*.

I have ſomtimes entertained my ſelf with the *remembrance* of this *Gentleman*, and gueſſed how *he* would have *ſported* at that paſſage of Mr. *Glanvill*, in his *Scepſis Scientifica*, where he complements the R. *Society*, to whom that book is Addreſſed.

We expect greater things from *Neoterick* Endeavors. The *Carteſian Philoſophy* in this regard hath ſhewn the World the way to be happy. And methinks *this Age* ſeems reſolved to bequeath *Poſterity* ſomewhat to *remember* it. The glorious Undertakers

Scepſi Scientifi. p. 133, 134

kers, wherewith Heaven hath bleſt our days, will leave the *World* better provided then *they* found it. And whereas in former times *ſuch* generous free-ſpirited *Worthies* were as the Rare newly-obſerved *Stars*, a ſingle one the wonder of an *Age*: In ours *they* are like the *Lights* of the greater ſize, that twinkle in the *Starry Firmament*: And this laſt *Century* can glory in numerous *Conſtellations*. Should *thoſe Heroes* go on as they have *happily* begun, they'll fill the World with *Wonders*. And *I* doubt not but *Poſterity* will find many things, that are now but *Rumours*, verified into (a) *practical Realities*. It may be ſome *Ages* hence, a Voyage to the (b) *Southern* unknown *Tracts*, yea, poſſiblie the *Moon*, will not be more ſtrange then one to (c) *America*. To them that come after us, it may be as ordinarie to buy a *payr of Wings* to flie into *Remoteſt Regions*; (d) as now a pair of *Boots* to ride a *Journey*. And to conferre at the diſtance of the *Indies* by *Sympathetick* conveyances, may be as uſual to future times, as to us in a *literary correſpondence*. The reſtauration of *Gray hairs* to *Juvenility*, and renewing the *exhauſted marrow*, may at length be effected without a *Miracle*. And the turning the now comparative *deſert World* into a *Paradiſe*, may not improbablie be expected from late *Agriculture*.

Now thoſe that judge by the narrowneſs of former *Principles* and *Succeſſes*, will ſmile at theſe (e) *Paradoxical Expectations*: But queſtionleſs, thoſe great *inventions*, which have in theſe *latter Ages* altered the face

a God forbid.
b 'Tis very cold going thither, if you believe Sir *Fr. Drake*; as I have ſhewed afore in my diſcourſe of the *North-weſt-paſſage*.
c Yes a little more; the Ancients had been there before; beſides, the difficulties ingoing to the *Moon* are more *inſuperable*.
d *Pacolet's* Horſe; *Fortunatus's* wiſhing-Cap; the skill of *Medea* in reſtoring *youth*, all *ancient* and *modern* fables ſhall be really atchieved!
e They that do not ſo, laugh at *you*, and think ſuch *expectations* thence *paradoxical*.

face of all things, in their naked *Propoſalls*, and meer *Suppoſitions*, (*f*) were to former times as *ridiculous*. To have talked of a *New Earth* to have been *diſcovered*, had been a (*g*) *Romance* to *Antiquity*: And to ſail without ſight of *Stars* or *Shoars* by the guidance of a *Mineral*, a ſtorie more abſurd then the Flight of *Dædalus*. That men ſhould *ſpeak* after their *tongues* were *aſhes*, or communicate with each other in *differing Hemi ſphears*, before the invention of *Letters*, could not but have been thought a *Fiction*. *Antiquity* would not have believed the almoſt incredible force of our (*h*) *Canons*; and would as coldlie have entertained the wonders of the *Teleſcope*. In theſe we all condemn (*i*) *antique incredulity*, and 'tis likelie *Poſterity* will have as much cauſe to pity *ours*. But yet notwithſtanding this *ſtreightneſſe* of ſhallow *Obſervers*, there are a ſet of (*k*) enlarged Souls that are more *judiciouſly credulous*, and thoſe who are acquainted with the fecunditie of (*l*) *Carteſian Principles*, and the diligent and ingenious Endeavours of ſo many true *Philoſophers*, will deſpair of (*m*) *nothing*.

f Prove that they ever did think of them: if they did not, they could not be *ridiculous* to *them*.

g Enquire into the Navigations of *Antiquity* and then ſay this.

h The ſtrangeneſs lies more in the incredible force of the *powder*: had they known that, they would not have thought the other *ſtrange*.

i I know not any that condemns the ancients *incredulity* about *ſuch matters* as were never propoſed unto them, but for the *credulity* of this *Age*, expect *ſcorn* rather then *pity*.

k 'Tis a pretty *philoſophy* indeed, it is all *invention*.

l Not of the *Paracea*, not of the *Philoſophers ſtone*, nor any thing in *Ovids Metamorphoſis*, *Atlantis*, or *Utopia*.

m Plus ultra, Page 66.

This is a moſt *extraordinary Flouriſh*: Yet I finde the *Rhetorick* defective in the ſuiting of the *Antitheſes* and *Antapodoſes*: but I ſhall not take notice of that fault now, it is ſo general in our *Comical Wits*. I ſhall now quit my Digreſſion, and reſume the controverſie betwixt the *two Diſputants*. Mr. *Glanvill*, for the credit of thoſe *Dioptrick Glaſſes*, told Mr. *Croſs*, "That he *might try them upon* Objects near, "*and* eaſily viſible, *by the* unaſſiſted ſight; *and if he made* "triall, *he would finde they altered the* Objects *in* nothing *but* "*their* proportions, *which are repreſented* larger *for the advantage*

" *vantage of* viſion *in things* ſmall *and* remote; *and we have* all " the like reaſons *to diſtruſt our* Eyes, *as theſe* Glaſſes (*for* " *their* informations *are the* ſame *in all things, but the men-* " *tioned difference*) *and there is no man ſuch a* fool *as not to* " *make allowance for* that.—— I ſee Mr. *Glanvill* is not only ignorant of the *Opticks*, but altogether unacquainted with *Teleſcopes*: for firſt there are ſome made by Mr *Smithwick* (a very *ingenious and worthy man*) which repreſent the *Phaſes* of the *Moon* very well, and yet *invert* all *Objects*, but that is no default or impediment where the thing looked on is *round*. Theſe *convex Teleſcopes* alter the *Object* in ſome thing elſe beſides their *proportions*: nor doth any ſuch thing happen in a *well-diſpoſed Eye* upon *viſion*. Secondly, he might have known this further *difference* betwixt an *un-aſſiſted ſight*, and what is performed by the *beſt* and longeſt *Teleſcopes* about ordinary Objects, that the *Dioptrick Tubes* do repreſent the *light* and *colours* of bodies more *dilute* and *remiſs* then they appear to the *naked Eye*. *Per Teleſcopia, præſertim longiora, objecta ſpectantur luce & colore dilutiora, quam libero oculo.* This is granted by *Zucchius* and others; and the reaſon is given by *Zucchius*, becauſe that ſo great an *expanſion* or *amplification of the Object*, and diſtancing of its parts one from the other, is equivalent to a *remiſſion* of thoſe *qualities* therein. But to ſhew Mr. *Glanvill* a little more of his ignorance in *Teleſcopes*, I ſhall ſhew him ſome further differences betwixt the *naked ſight*, and what is performed by thoſe *Glaſſes*. For ſome of them repreſent ſome *Objects* greater then they appear to the *naked eye*: Some (in the *ſhorter Tubes*) are repreſented *no bigger*, or rather *leſs* then they otherwiſe ſeem: Some *Objects* in the *longer Teleſcopes* are magnified indeed, but *nothing ſo much* as other *Objects* are by the ſame *Glaſſes*. The Experiments

Duobus vitiis convexis inſtructo Teleſcopio, habetur ſimul & ſemel objecti mediocris, vel multarum partium grandioris repræſentatio, ſed inverſa: ſi debite addatur tertium convexum, multiplicatis adhuc refractionibus, una unius obtinetur apparentia, & in ſitu conformis Objecto. *Zucchius* phil. opt. part. 1. c. 17 ſect. 2. p. 180.

Zucchius ubi ſupra p. 181.

Expanſionem repræſentativorum æquivalere remiſſioni, & denſationem eorum intenſioni, & utramque non à medio, ſed à propria conditione propagationis radiorum pendere. *id ib.* Si Teleſcopium ſit extraordinariæ longitudinis, ex nimia expanſione, quæ æquivalet remiſſioni qualitatis viſibilis, apparet nimis dilutum: ut minus in eo varietas partium internoſci poſſit. *Zucchius* phil opt. p 2. tr. 3. c. 7. ſect. 5. p. 366.

Zucchius phil. opt. part 1 c. 17. ſect. 6 p. 204

ments are obvious: place a *candle* in the dark at some considerable distance, and the flame will appear *round* and *encompassed with rays*: then take a short *Telescope* fitly made and placed, and look through it, and you will see the irradiation taken off, and the flame represented as *oblong*, not *round*, and rather *seemingly less* then *greater* then it appeared before to the *naked Eye*. Then turn your eye unto any *coloured Object*, and take notice how big it seems: assume the same *Telescope*, and you shall find that to be magnified above what it seemed to the *naked eye* by much. After this, take a long *Telescope*, and view the aforesaid *candle* through that; and at the same distance view some other *coloured Object*, and you shall see that this last *Telescope* will represent both *Objects* much *magnified*; but the *Candle* less of the two *by far*.

But I shall adde further, that it is not to be doubted but that the *Telescopes* of *Galilæo*, *Scheiner*, *Rheita*, *Gassendus*, *Grimaldi*, *Eustachio Divini*, *Hevelius*, *Hugenius*, *Ricciolus*, and *Zucchius*, were good *in their kind*, and that they did represent *Objects* as truly here *on earth*, as *any* could; yet when they come to be applied to the *Celestial Phænomena*, what *difference* is there in their *Observations*? How do they *complain* either of the default of the *Telescopes*, or want of *care* or *skill*, each in the other? *Simon Marius* boasts of his accurateness: *Scheiner* in his *Apelles* tells us, *Observationes omnes factæ sunt summo studio cœlo serenissimo, semper cum observatum est, & obscurissimo, plerumque in absentia videlicet Lunæ: talis vero variis & excellentissimis, quorum uno meliorem adhuc ad stellas non vidi.* But enough may be collected to this purpose out of the foregoing discourse, so that I need not repeat it over again: out of all which as I would not be understood *totally* to discredit the use of *Telescopes* in *celestial discoveries*, (I do not

Si Lunares discos, post tot inspectores, & inspectiones. publicatos videas, neque numero, neque conformatione sibi correspondent: quam multæ partes vel præ aliis circumpositis illustriores interjectæ & sua multo minori illustrationis exhibitione illas interrumpentes, aliquos latuerunt, & in angustioribus, vel minus accuratè expressis. Discis omissæ, quæ verè internoscibiles sunt in luna, & ab aliis consignantur? quantum totius Disci lunaris terminatio, & insigniorum in ea partium, variata? Zucchius phil opt. part. 1. c. 17. sect. 8. p. 233.

Vide *Scipion. Claramont.* de Univers. l. 3. c. 8.

deny but *some things* and *some motions* are observed *by them*, which a *naked Eye* cannot discern; but this *knowledge* arrives to a slender degree of *certainty*, when the *Phænomena* come to be *particularly* explicated; and *theoremes* or *assertions* framed thence) so I would not have them *too much relied* on, nor men be too confident in *principles* and *Conclusions* which have no *surer Foundation* then those *probabilities*: and I do herein joyn with *Claramontius* in that *Epiphonema*, *In tanta diversitate, quid certi ex tubo Optico habemus?* If I must suspect the *skill* or accurateness of *Galilæo*, *Scheiner*, *Gassendus*, *Hevelius*, *Fontana*, *Ricciolus*, and *Zucchius*, and such like; pardon me, if I know not *whom* to believe.

I have been the more large in this Point because of the *insolence* with which Mr. *Glanvill* persecutes that *Reverend*, and otherwise *learned* person, whom he represents to the world as *He* pleaseth, and accordingly treats him with that *contempt* and *scorn* which is less allowable towards a *Divine*, and such a one as is, and always hath been in that Countrey very much esteemed by several *honourable* Families, as well as others. However God hath so *providentially* ordered the *dispute*, thereby to check the *pride* of our *Virtuoso*, that *The* eMan *of Words* cannot triumph over the eMan of Axiomes. And if it be true, that our *Aristotelean* was *amazed* at the hard words of *Dioptrick Tubes*, &c. as if there had been *Magick* in them: I doubt not to *Justifie Him* in it; for the insolent *Virtuoso* made use of *them*, not as became a *knowing person*, but as *Conjurers* use *strange termes*, and of an *uncouth sound*, though perhaps really *Hebrew*, *Latine*, or *Arabique*.

Besides all this, perhaps Mr. *Cross* seems to have been offended at something in that mixt *discourse* or *dispute*, that might derogate from the *Authority of the Scripture*: many sayings are not *innocent*, but as they are *worded* or *uttered*. To say *the Scripture was written to mens fancies* is an expression very *unwary* in a *Divine*: although a *convenient* interpretation may *excuse* it. To say *it is not written according to vulgar* eMethods may so be spoken, that the *action* may render the words *culpable*. And in *another Age* they might have

have passed better then *now*, when men are prone to *vilifie the Scripture*, especially the *little Wits*. I perceive Mr. *Sprat* is not over-tender of the dignity of the *Scripture*: for although there be an *ancient Canon* of the Church against the applying the *Sacred Word of God* ad *scurrilia* & *adulatoria* (which *Canon* is authorised even by the *Council of Trent*) yet doth he encourage men to apply it to ordinary *Raillery*. "*The* Wit *that may be borrowed from the* Bible *is magnificent*, "*and as all the other Treasures of knowledg it contains, inexhaustible. This may be used and allowed without any* danger of "prophanenesse. *The Ancient Heathens did the same. They* "*made their Divine Ceremonies, the chief subjects of their phansies: by that means their Religions had a more awful impression, became more popular, and lasted longer in force then* "*else they would have done, And why may not* Christianity "*admit the same thing, if it be practised with* Sobriety *and* "Reverence. *What irreligion can there be in applying some* "*Scripture-expressions to* Natural things? *Why are not the* "*one rather exalted and purified, then the other defiled* "*by such Applications?* —— The Case is clear *Gentlemen*, Hath not the Lord said, *What hast thou to do to take my words into thy mouth since thou hatest to be reformed?* Besides, methinks our *Divine* might have remembred the feast of *Belshazzar*, and the resentment that the *Lord* expressed upon the applying of the *consecrated vessels* to the serving in a *festival banquet*, though to a *Prince*. He might have called to minde *the hand-writing upon the wall*, and very probably have inferred with himself, that if *God* was so concerned at the misapplication and abuse of those *Temple-Vessels*, he would much more severely interess himself where that *Word* of his, which he hath so many ways *hallowed* and recommended to our *Veneration*, is abused to *raillery*: This *Humour* is no part of the *words* or *works* in which the *Man of God* is to be *perfected* by reading of the *Holy Scripture*. I fear the *great Judge* will one day say unto these *Drolls*, *Ye are weighed in the ballance, and found too light*. To conclude, the generality of *Raillery* amounts to no more but so many *idle words*, and *they* become *doubly criminal* by being *profane*.

Plus ultra Page 4 4.

But this practice of theirs was the ruine of their *Religion*, as any man may judg who sees what use *Clemens Alexandrinus* and *Lactantius* make of it against *Paganism*. And the *Greeks* thought so when they punished one, ὅπερ ἐξωρχήσατο τὰ Εὐστήρια

Of the *Antiquity* and *Use* of *Chymical Physique.*

Plus ultra, Page 101.

"CHymistry *hath indeed a pretence of the great* Hermes *for* "*its* Author,(*how truly I will not dispute.*) *From him 'tis* "*said to have come to the* Egyptians, *and from them to the* "Arabians; *Among* these *it was infinitely mingled with* va- "nity *and* superstitious devices: *but it doth not appear* at "all *in use with* Aristotle *and his* Sectators: *Nor doth it* "*appear that the* Grecians, *or the* disputing Ages, *were con-* "*versant in these useful and* luciferous Processes.——

Our *Virtuoso* is not willing to dispute whether *Hermes* were the Author of Chymistry, or not: It had become one that is encharged with the Cure of Souls very well, to have declined all these other *disputes*, as being remote from those *Studies*, by which he *ought* to qualifie himself for a befitting discharge of the *Ministry*. But to tell him further, what I am sure he is ignorant of, the *Egyptians* did never attribute to *Hermes* the Invention of *Physick*, or any part of it, but to *Apis* and *Æsculapius*; and as for that *Chymistry* which they practised, which consisted in melting down and improving of *Metalls*, or making of *Gold*: the *Egyptians* did never reckon the discovery of that *Art* amongst the praises of their *Hermes*, though they were very forward to magnifie *him*, and to ascribe unto *him* a great many *Elogies*. Nay, when they do recount the *Authors* of their *Chymistry*, though they do not agree about *them*, yet there is none that transfers that *honour* upon this *Trismegistus*. But whether *Æsculapius*, or the wicked *Angels*, (to both which the *Invention* is attributed) were the discoverers of *Chymistry*, I think I may allow the *Egyptians* to have been the first *Practisers* of it, and that there wanted not those

Chemiæ *nomine olim haud leges quid aliud significatum, quam* χρυσοποιητικὴν *aut vero* μεταλλυργικὴν *illam qua vilium metallorum lapidumque in melius commutationem pollicetur. Ne quidem legere est, vel medicamentis præparandis operam aliquam impendisse primos* Chemiæ *professores.* Conring. *de Med. Herm.* c. 3. p. 15.

thoſe who did mention *Hermes* amongſt them that uſed *that Art*, and were eſteemed *Philoſophers*. Nor is the *Egyptian Chymiſtry* of any great Antiquity, there being no mention of it in any *Greek* or *Latine* Writer, till almoſt the fourth *Century* after *Chriſt*. Neither is the name only of *Chemia* or *Chemiſtry* of ſo modern a date: but there is not any record of any *book* written, or *work* performed, that *imports* any ſuch thing. Yet have the *Alchymiſts* (it is true) pretended to a greater *Antiquity*, entitling ſeveral *ſpurious* books to *Hermes*, *Moſes*, (and *Miriam* his Siſter) *Democritus*, *Plato*, *Ariſtotle*; and made as if *their Art* were intimated in the fable of the *Golden Fleece*, the *Heſperian Orchards*, and the *Song of Solomon*. In which I cannot but take notice of the different procedure of thoſe *Chymiſts*, and our *Experimental Philoſophers*: the *one* attributed all *glorious diſcoveries* to the *Ancients*, their *Predeceſſors*; *theſe* will not allow *them* thoſe praiſes which *indiſputably* belong unto *them*. But however, that I may grant our *Virtuoſo*, that *Chymiſtry* did flouriſh in *Egypt* in *ſuch manner* and at *ſuch time*, as I have declared out of *Conringius*, (to whom I refer the inquiſitive Reader) yet I muſt not gratifie him with this other conceſſion, that *from them it came to the Arabians*, the followers of *Ariſtotle* not being at all acquainted with it, nor the *Grecians*, or *thoſe diſputing Ages*, being at all converſant with *it*. For it is made evident by *Conringius*, (*c.* 26. *p.* 368.) that it paſſed from the *Egyptians* to the *Greeks*. There are of *Greek* Writers, *Zoſimus Panopolita*, *Olympiodorus*, *Stephanus*, *Syneſius*, *Michael Pſellus*, *Blemmydas*, and many others, which are inſtanced in by the ſame *Author*, and deduced through the ſeveral *Centuries* anteceding the *Saracen* Empire. The very name of χημεία or χυμεία,

Vide *Conring.* c. 3 p. 28.

In the time of Conſtantine A. D. 320. Firmicus *is ſaid to be the firſt that is recorded to have named* Alchimia; *he ſaith, that* Saturn *diſpoſeth to* Alchimy. *Whence* Libavius *argues that it was then an* Art, *and had been long practiſed, or elſe how comes it under* Aſtrological Prediction? *But there is no conſequence in that reaſon of his it being uſual for Aſtrologers to accommodate the Stars ſo as to have an influence upon novel inventions. Under* Theodoſius *the* Great, A. D. 38. Helodorus *writ a book to the Emperour about the* Chymopœia; *and ſomething about that Art to* Cercilius, *as* Cedrenus *witneſſeth.* Libav. *in Exam cenſur.* Pariſien.

Several of theſe Greek Writers were ſeen by Salmaſius *in the* King *of* France *his Library, and by* Reyneſius, (*vide var. lection l.* 2. *c.* 5 *p.* 55.) *who tranſcribes this paſſage as the Concluſion of one of them.* Τίνωσκε ὦ φίλε καὶ τὰ ὀνόματα τῶν πτωτῶν. Ἀρχὴ Πλάτων Ἀριστοτέλης, Ἰωάννης ἱερεὺς Δημήτριος. Ζώ-

is

σιμος ὁ μέγας Ὀλυμπιόδωρος Στέφανος ὁ φιλόσοφος, Σοφὰρ ὁ ἐν Περσίδι, Συνέσιος, ἀστάνης ἀπ' Αἰγόπτου, *lest any one should think that by* ποιηταὶ *were meant our* Wits, *and* Poets, *and* inventors. *I must adde, that it is a* name *long ago fixed upon the* Chymists *and* Chrysipporeticks, *as* Reynesius *declares.*

is *Greek*, as *Vossius* observes, *de Philos.* c.9. The *Moorish* particle *Al* being prefixed. *Nor* is the word *Alembex* of any other original, being compounded of the said Αλ & ἀμβὶξ, a term used by *Dioscorides* to signifie a vessel, not much unlike our *Limbecks*. Diosc.l.5.c.64. vid. *Conring.* & *Voss.* ubi supra. From the *Greeks* together with other Learning, even *Chymistry* was transmitted: and *Geber* himself (as *Leo Afer* relates it, *lib.3.pag.136.*) was but an Apostate *Grecian.* This *Geber* is the most ancient of *Arabian Alchymists*, their *Idol*, and styled *Magister Magistrorum.* I am not ignorant that *Conradus Gesnerus* (in præf. ad *Evon.*) and some others have reckoned upon *Geber* as if he had been originally a *Saracen*, and the *Nephew* of one *Mahomet*: some say he was the Grandchild of the Impostor *Mahomet*: but their credit is not equal to that of *Leo Afer*, who appears a most learned person, and inquisitive even to *Curiosity* into the *Lives* as well as *Customs* of the *Moors*, his Countreymen. *Habent Fessani Arabes multa Chemicæ artis opuscula a viris doctis conscripta, inter quos potiorem locum habet Geber, qui centum annis post Mahometen vixit, quem natione Gidum aiunt fidem abjurasse.*——*Gesner* cannot tell at what time he lived, but he saith he was not the *Inventor*, but *Illustrator* of the Art of *Distillation.*——*Quanquam non illum primum hujus Artis Inventorem, sed Illustratorem fuisse existimo. Hoc in opere quod summæ perfectionis inscribitur, de distillatione in Gener Multa pulchre disserens, varios distillandi modos fere omnibus notos esse scribit: nimirum ut vetus quoddam suo seculo, non recens quoddam inventum.*

Geberus *quem volunt circa annum Portus virginei sexcentissimum in vivis fuisse* Libav *exam.censur.* Parisiens.

Afer *Hist. Africæ* l.3.

Conrad Gesn. *in præf. ad* Evonym.

But though the *Greeks* were not free of the *Metallurgical* part of *Chymistry*, yet did they not prepare any *Medicines Chymically* (that I know of,) except it were the *Alcalisate Salts*, and *Ecchylomata*, or *Juices* formed into *Extracts*, and *Oyls drawn per descensum.* This seems manifest in that *Oribasius*, *Aetius*, *Paulus Ægineta*, *Alexander Trachcanius*, *PAULUS & JOANNES Jatrosophistæ*

phiſtæ of *Alexandria*, *Simeon Sethus*, *Actuarius*, *Nonus*, and others mention no ſuch Medicaments: no, nor *Michael Pſellus*, though he writ a peculiar Tract about *Chemiſtry*. Neither hath *Nicolaus Myrepſus* (though a modern *Grecian*) any *Chymical* Preparation. Conring ius c. 26. p. 370. Geſner. *in præfat. ad* Euonym.

The *Arabians* ſeem the firſt that ever accommodated *Chymiſtry* in an eminent manner to *Phyſick*; if it be true, as *Libavius* imagines; that *Abulchaſis* did live in the time of *Muhauia* the *Saracen*, that ſetled their Empire at *Damaſcus Anno Dom.* 660. Chymiſtry then ſeems to have been regulated into an *Art*; He writ a Book of *Phyſick* called *Servitor*, which principally treats of *Medicines Chymically prepared*, and uſeth the terms of *reverberation*, *calcination*, *coagulation*, *diſtillation per aſcenſum* & *deſcenſum*: and many *ſuch like expreſſions*, together with *Proceſſes* purely *Chymical*. It was *then* that *Alchymie* was called *Perfectum Magiſterium*; and that which we call *Oyle of Bricks*, did bear the name of *Oleum Sapientiæ & Perfecti Magiſterii*. Libav *in exam. ſent.* Paris.

So *Avicenna* ſpeaks not only of *Roſe-water* diſtilled: but of *Mercury* and *Arſenick* ſublimed: after him *Joannes Meſues* ſhews how to make ſeveral *Chymical Oyls*, as of *Amber*, *Wheat*, *Oleum Philoſophorum*, &c. Neither is it to be doubted, but that there were an infinite number of *Chymical Proceſſes* latent in the hands of particular *Artiſts*, ſince *Joannes Meſues* refers us unto them, viz. *de quibus loquuntur, qui quæ ſunt occulta in rebus manifeſtant & detegunt. Hos quoque aggredere rei hujus cupidus tam famoſæ apud illos.* After that the *Weſtern Chriſtians* were civilized and inſtructed in the *Sciences* by the *Moors* inhabiting *Spain*, and that *Phyſick* ſuperſtructed upon the principles of *Galen*, *Avicenna*, and *Averroes*, was derived unto them, thoſe *Sectators of the ancient Philoſophy* improved *Chymical Pharmacy* very much. Conring. *ubi ſupra*, p. 374. *Vid.* Conring. *ubi ſupra*. Reade *Libavius* more fully upon this ſubject in *Exam. cenſur. Pariſienſ.*

Nor

nor were *Albertus Magnus*, *Aponensis*, *Gentilis de Fulgineo*, *Arnoldus de villa nova*, *Raymundus Lullius*, or *Joannes de Rupescissa*, or *Isaacus Hollandus*, or *Basilius Valentinus*, or *Antonius Guainerius*, or *Michael Savonorola*, or *Montagnana*, or *Hieronymus* Schallerus, and *Magenbuchius* (Chymical Physicians at *Norimbergh* before *Paracelsus*) or *Guilielmus Varigana*, or *Antonius Fumanellus*, or *Wolfgangus Talhenserus*, or *Hieronymus Brunsvigus* (the first that writ of *Chymistry* in the *German* tongue) any *other* then *Pretenders to the ancient Physick* and *Philosophy*. There was no *faction* betwixt the *Physicians* in those days; nor did *they* undervalue or decry each *other*; They rather represented *themselves* to be Adherents and *Sectators* of *Aristotle*, then his *Enemies*; and chose rather to *sophisticate* his fourth book of *Meteors*, to shew that *great Man knew all things*, then condemn all his other works, as if *he knew nothing*. Nor were *they* only followers of the *PERIPATETICKS*, but I finde the *Chymists* that did precede *Paracelsus* to be accounted *Hippocratical Physicians*: witness this passage in *Caspar Bravo*, who inquired more into them then I have had leisure to doe.

Conring. ubi supra, c. 27. p. 379. 380, &c.

Conring. ibid. c. 28, p. 387. *Erastus* de metall. p. 34.

Caspar Bravo Resolut. Medic. part. 1. disp. 1. sect. 1. resol. 3. sect. 2.

Resolvendum, artem Spagiricam veterum Spagiricorum, quam Avicenna, Geberus, Rhasis, Arnoldus de villa nova, Raymundus Lullius, Blemmydas, *Braceseus, Virceanus, Joannes Augustinus, Panterus, Isaachus Monachus, Morienus, Zosymus, & alii Hippocratis Sectatores professi sunt diversam esse a Secta Paracelsistica.* With this agrees that passage of *Conringius* de Med. Herm. c. 28. *Certe ante Paracelsum haud est observare in Chemicorum scriptis singularem aliquam sive Hermeticam, sive Chemicam Medicinam. Observata autem est plerumque medendi illa via quam Hippocrates, Galenus, horumque Sectatores cum Græci tum Arabes, interq; eos Avicenna calcaverant: quod unum Arnoldum Villanovanum legenti non potest non Sole videri clarius.* So *Primrose* de vulg. Error. l. 4. c. 1.

With him agrees *Libavius* in the forecited Treatise.

c. 1. *Hæc medicamenta præparandi ratio non a Paracelso inventa est: sed multis ante Paracelsum natum seculis exculta fuit ab iis etiam Medicis qui Galeni doctrinam sectabantur, ut Raym. Lullio, Villanovano, &c.*

But when *Paracelsus* was seised with the same *spirit* that seems to sway some of the *Virtuosi*: then did *he* begin to decry the study of *Languages*, as loss of time; our *Wits* call it *Pedantry*. *He* vilified *Logick* as that which caused *endless disputes*, and darkned rather then discovered *Nature*: He calls it *matrem odii, rixarum & litium*; He prohibited the reading of other *good* and *Ancient Authors*. He seemed to be of *no Religion*; and if for any, it was to be without *Metaphysicks*, without the mixture of *Glosses* and *Interpretations*, *Solum textum Scripturæ legendum, interpretationem nullam adhibendam*. He calls upon all *Universities* and *Countreys* to resort unto *him*, to follow *him* and his *new discoveries*, his *real Philosophy*, his *Essential Anatomies*, all other performances being but *empty* and *verbose*.

Because I observe som resemblance betwixt the invitations of Mr. *Sprat* and his, I will set one of his passages down in the Preface of his *Paragranum*, viz. *Me sequimini; Non ego vos sequar. Me, me, inquam, sequimini, Avicenna, Galen, Rhases, Montagnana, Mesue. Me sequimini; non ego vos sequar, Parisienses, Monpelienses, Suevi, Misnici, Colonienses, Viennenses, qui Danubium & Rhenum accolitis. Vos item Insulæ marinæ, Italia, Dalmatia, Athenæ, Græci, Arabes, Israelitæ, me sequimini, non ego vos sequar. Mea enim Monarchia.* Hereby any one may see that He was as *conceited* of himself, and as great a *contemner of all ancient Learning*, and of *Aristotle*, and *Galen*, *&c.* as some of the *Virtuosi*: and as *ignorant of Latin* and other *tongues*; and as *false* and *imperfect* in his *relations*; as *variable* in his *hypotheses*, as if he held nothing but with the power of *revoking* it, which is a great qualification of a *modern Philosopher*. He was not for the *particular methods* in vogue, but for a *general Enquiry* into the *Experiments* of *old Women, Mountebanks, Hangmen, Husbandmen, &c.* He could make use of the *writings* and *inventions* of others, concealing *their names*, and boasting them [illegible]

Sed in primo *de pestilitate* tractatu primo, ubi de *Chelidoniæ* contra imaginationes Magicas amuleto disserit, adeo non rejicit *Galeni & Hippocratis* decreta, ut etiam amplius videre velit *Galenicum*, quàm omnium schola tum pr[illegible]

as becomes a modish Experimentator. To evince this last assertion, I shall set down some passages of *Crato*, and others, to shew that the *disputing Ages* were not so ignorant of *Chymistry* as Mr. *Glanvill* pretends. *Crato* in a Letter to *Erastus* writes thus; *Remedia quibus aliquando usus esse dicitur, non illius esse ex eo certus sum, quod librum vidi ante ducentos fere annos a Monacho quodam Ulmæ scriptum, in quo eadem medicamenta, quæ ille frustillatim, nunc in has nunc in illas chartas sparsit, perspicue sunt scripta.*—And elsewhere, *Fuit in bibliotheca viri optimi & integerrimi Marci Singmoseri Sacratissimi Impp. Consilii a Secretis primi, liber ante ducentos annos a Monacho quodam exaratus. Eo multis mensibus usus sum, & omnia quæ isti (Paracelsici) tanquam in Eleusiniis sacris mussitant, tam evidenter tradita, ut neminem fallere possent animadverti.* He himself confesseth who were his teachers in *Chimistry*, and that *he* was far from being the first *Inventour* of it. "*Theophrastus Paracelsus* natus "anno Christi 1493. mortuus 1541. Hic non erubuit con- "fiteri se remedia in Chymicis accepisse, & his ipsis Scien- "tiam Artis Chymiæ debere. *Antiqui Philosophi* (ait in 2. "*parte Chirurgiæ mag. tractat.* 3. c. 1.) *studiosi indagandarum* "*longæ vitæ causarum* (recitamus breviter sententiam) *de-* "*stituti vero perfecta præparandorum componendorumque me-* "*dicamentorum scientia ab Alchymistis eam petere non sunt ve-* "*riti, atque sic utronemque laboribus conjunctis genuina præpa-* "*randorum remediorum Scientia exorta, & variis Chemicis ex-* "*perimentis in medicinam transfusis est aucta, maxime vero* "*tincturis & floribus metallicis, quarum tincturarum quanta* "*fuerit efficacia, antiqui ea de re Codices testantur, quos diu a* "*Pseudomedicorum turba suppressos, nos publicos facere non du-* "*bitavimus. Remedia nostra ex Chymicorum Schola prodiisse* "*non dubito fateri: & quoniam Chymica ars infinitis errori-* "*bus scatere visa est, illud quoque Augiæ stabulum repurgandi* "*laborem sumpsimus: in quo felicius mihi versari licuit, quod ob* "*ineunte ætate magnæ Artis studio captus summa diligentia sub* "*excellentissimis præceptoribus Arti huic studuerim. Præce-* "*ptores enim fuerunt Wilhelmus Hohenheimius Pater, & alii* "*infiniti: præter hos quoque scriptis adjutus sum Setthagii Epi-*

Erastus part. 4. p. 300.

Præf ad Exercit. Scaliger. Hartman & Crollius *published no* new *medicines.* Cæterum neq; *Crollium* neq *me* a iquid novi protulisse libenter fatemur, neq; ea unquam utriusq; nostrum mens fuit. *Hartman.* in not. ad *Croll.* p. 138. *Libavius* ubi supra.

scopi,

" *piſcopi, Erhardi Laventalii, Nicolai Hipponenſis Epiſcopi,*
" *Matthæi Sobechtii Suffraganei Treiſingenſis, Abbatis Span-*
" *heimii, aliorumque doctiſſimorum Chemiſtarum: Quin & va-*
" *riis eorum experimentis factus ſum locupletior, inter quos ho-*
" *norio cauſa nominandus mihi venit nobiliſſimus vir Sigiſmun-*
" *dus Fueger Schwathenſis, qui magnis ſumptibus pluribus mi-*
" *niſtris ſuſtentatis Chemicam acceſſione locupletavit.* Hæc ibi
" *Paracelſus.* Neque vero falſa ſcribere eſt putandus,
" quandoquidem ſeculum iſtum & exercitiis Chymicis &
" voluminibus ſcatuit, cum jam plures tractatus typis
" publicis ſint impreſſi, nihilominus cernimus, ſubinde ex
" tenebris prodire plures, ita ut ne *Theſauri* quidem multi
" videantur ſufficere cupiendis, nec *Theatra.*

His followers confeſs, that he borrowed much out of *Baſilius Valentinus,* and more out of *Iſaacus Hollandus,* as *Penottus* declares, *Cum incidiſſem in Iſaaci librum de opere vegetabili, reperi de verbo ad verbum doctrinam de tribus principiis, & de ſeparatione quatuor Elementorum ab eo deſumptam. Unde conſtat* illum *præcipua ſua Opera ſuffuratum fuiſſe, atque hinc inde expiſcatum: ut de gradationibus medicinarum ab Arnoldo, Archidoxa a Raymundo Lullio ex ſua Arte operativa: de Arcanis a Rupeſciſſa; nihil prorſus a ſeipſo præter convitia: & maledicta: a Trithemio varia.*---The ſame is confeſſed by *Quercetan* ſomwhere as I remember, and *he* himſelf *intimates* it by adding to many *preparations* the words, *Ex noſtra correctione, ex mea emendatione.* Out of all which it is evident, that neither the *Grecians,* nor the *diſputing Ages* were ſo ignorant of *Chymiſtry,* as Mr. *Glanvill* aſſerts; as it is certain that the *Arabians* as well as the *Grecians* were *diſputers* and followers of *Ariſtotle* and *Galen,* and that particularly *Albertus Magnus* and *Roger Bacon* were *Schoolmen.* Nor can any man doubt the ſame of thoſe other *Biſhops* and *Monks,* who knows with what *perfect* Veneration, in thoſe days *Ariſtotle* was regarded. How *uſeful* and how *luciferous* their Proceſſes were, it is not for Mr. *Glanvill* to judge, who is ignorant of *them*: but any one will allow them, both the *one* and the *other, recommmendation,* who conſiders that their *Chymical* Proceſſes which paſſed amongſt *them* gave occa-

De denar. medic.

Vide *Conring.* de med. Herm. c. 24. p. 252, 253.

sion to *all, and make a great part of the improvements in Chymistry*, in *Dioptricks* and other *Subjects*, wherein our *Virtuosi* pride *themselves*. Particularly as to *Chymistry*, it is as clear that the *disputing Ages* and followers of *Aristotle* were acquainted with *it*, and eminent for *it*, as that there were *Monks* and *Schoolmen*. Those men whom Mr. *Glanvill* so explodes, and with whom the *Historian* disports *himself*, had of late years before *Paracelsus*, in a manner, *solely* the knowledge of *this Art by which Nature is unwound*, &c. This *Sennertus* granteth. *Proximis seculis fere inter Monachos latuit Chymia, quorum non pauci illud, quo abundabant, otium post sacras meditationes & orationes, arti huic præstantissimæ honeste tribuerunt: inter quos fuerunt Raymundus Lullius, Albertus Magnus, Joannes de Rupescissa, Savanarola, Morienus, Rogerius, Trithemius, & Frater Basilius Valentinus: quorum scripta multa hoc seculo in lucem edita sunt, & multa adhuc manuscripta passim latent.* I hope there is no exception against *Sennertus*, how partial soever *Erastus* or *Crato* may seem. And to affront our *Virtuoso* a little more, it was a follower of *Aristotle*, and those *Disputers*, a pitiful *School-Divine* that discovered the making of *Gun-Powder*, which single invention out-does all that our *Collegiates* boast of. In the year 1354. *Bertholdus Schwarz* a *Benedictine Monk* discovered it, and I dare warrant him in *those days* no enemy *to the man of Stagyra, the Idol of disputers*; A very ancient *Manuscript* gives him this Character. *Bertholdus Schwarz Goslariensis Monachus ordinis Sancti Benedicti, cum mire Chymicis delectaretur, atque eorum peritia jam magnam sibi nominis existimationem acquisisset*, &c. Any one may read the rest in *Kirchers Mundus subterraneus l. 12. sect. 5. part. 4.*

De Consc. Chym. c. 3.

I shall relate some particular processes in *Chymistry*, which are mentioned by such as were not *Arabians*, but of a much more *ancient* date. In the time of *Julianus* and *Valentinianus* Emperours lived *Aetius Amidenus*; he and *Nicolaus Myrepsus* (who is indeed later then *Mesue*) do mention the distillation of Oyls *per descensum*, as *Gesner* shews; and *Vossius* together with *Conringius* avow——

Vossius de philosoph. c. 12. sect. 12. Gesn. in præf. ad Eunym. Vossius de philos. c. 13. Conring. de med. Herm. c. 26 p. 371.

Nicolaus

Nicolaus Myrepsus (or *Præpositus*)--*in quo illud miror nullam ab eo aquarum oleorumve Chymisticis instrumentis paratorum mentionem fieri. Capnistum tantum oleum, quod per descensum distilletur, describit, ut Aetius quoque.* As to the ways of making *Chymical Extracts*, let any man judge whether the *Grecians* were ignorant of them, by these passages, as they are cited by *Gunterus Billichius*, viz. *Chylismata extrahuntur aut exprimuntur. Extrahendi nec ars nova est, nec novus modus, quanquam Heurnio ita visum sit Method.* ad *praxin. lib.* 1. *&* *lib.* 2. *c.* 25. *Rationem ejus a Dioscoride accipe, verbis interpretis Ruellii* lib. 3. c. de *Gentiana. Contusa, inquit, radix quinque diebus aqua maceratur, postea in eadem tantisper decoquitur, dum extent radices, & ubi refrixit aqua, linteo excolatur: mox discoquitur, dum mellis crassitudo, fiat fictilique reconditur. Similia* cap. 9. *ejusdem libri* de *Centaurio minore habet. Dabo tibi ipsissima Dioscoridis verba*; Χυλίζεται δὲ ἡ πύα συλλεγομένη ἐγκύμων οὖσα σπέρματος, καὶ ἀποβρεχομένη ἡμέρας ε'. εἶτα ἕψεται ἄχρις ἂν ὑπερέχοι τὸ ὕδωρ· ἔπειπα τούτου ψυχθέντος, ὑλίζεται δι' ὀθονίου θλαβείσης τῆς πύας, καὶ πάλιν ἕψεται μέχρι μελιτώδους συστάσεως. *Nequid ad plenitudinem artificii deesset, subjungit; Quod siquid concretum faucibus vasis adhærescat, deradunt, reliquoque humori permiscent. Item hæc; Quæ autem siccis radicibus aut herbis liquamenta exprimuntur, decocta (ut in Gentianæ mentione retulimus, præparantur. Ita Lycium & Abscynthium, hypocistis, & consimilia coguntur.* De *Lycio vide* cap. 135. lib. 1. *de hypocistide libri ejusdem cap.* 128. *Chylismatis denique absynthini, cap.* 26. *meminit. Nec aliter Extractum Melampodii clarissimus Raymundus Mindeserus concinnavit, quod in Pharmacopœia Augustana inter Ecchylismata Cathortica locum non postremum reperit. Ut liqueat, extrahendi artificium, dignum omnino fuisse, quod & erudita antiquitas inveniret, & non degener posteritas imitaretur. Nec quicquam Chymia novi, præter liquorem attulit.*

Observat & paradox. chym. l. 1 c. 2. p. 32.

Dioscorides lived in the days of Cleopatra and Marc. Anton. whose Physician he was, a follower of Herophilus, and consequently of Hippocrates and Aristotle. Vide Voss de philos. c. 11. sect. 20. & Jonsium de script. hist. & phil. l. 2. c. 6. p. 145.

Con-

Concerning *fixed* and *Alcaliſate Salts*, the *Chymiſts* and *Chymical* Phyſicians make a great noiſe: and undoubtedly the *Invention* is very *extraordinary*, and their uſe very *ſingular* in Medicine. Yet both the preparation and the uſe of *them* is ſet down by *Dioſcorides*, *Galen*, and *Aetius*, in their diſcourſes about *Theriacal Salts*; Though latter days have reformed the preparation, as *Galen* endeavoured to do that which he found in uſe in *his time*. Beſides, I obſerve out of *Gunterus Bellichius*, that *Ariſtotle* was not ignorant of it. *Ariſtoteles auctor eſt, Umbros cinerem harundinis & junci decoquere aqua ſolitos, donec exiguum ſupereſſet humoris: qui ubi refrixiſſet, ſalis copiam fecerit*, lib. 2. *meteor.* cap. 3. *Hoc ſe apud* Theophraſtum *invenire* Plinius *teſtatur*, lib. 31. cap. 7. *Idemque non harundinei tantum juncique ſalis meminit, ſed colurni inſuper, & querni. Amborum autoritate (nam de Theophraſto nihil mihi conſtat) Chymicorum caſtigabitur temeritas, quæ ſuis inventis ſalem cineritum annumerare auſa eſt.*

See the antiquity of the uſe of Alcaliſate *and other* Salts *by the* Ancients, *largely proved by* M. Rulandus progymn. alchym. qu. 14, 15.

Vide *Galen.* de Theriaca ſub finem, & *Pharmacop. Auguſtan.* in append. ad antidot. claſſ. de Salib. Theriacal.

G. Bellichius obſervat. & paradox. *chym.* l. 1. c. 2. p. 30. & in *Theſſalo chymicum* c. 7. p. 90.

The preparation of *Salt-peter* with Sulphur, in order to the making of what the *Chymical* Phyſicians call *Sal prunellæ*, was known to *Hippocrates*, and others of the *ancients*, and they uſed it in *Squinonſyes* in Gargariſmes for the *tongue* and *throat*. *Deſinant in poſterum Chymici de lapide Prunellæ magnifice gloriari. Nam & apud Hippocratem* τὸ νίτρον ὀπτὸν *quater invenimus. Semel quidem in tertio de morbis: bis in de internis affectionibus: denique ſemel in lib. de morb. mulier. Ac ne dubites erudite antiquitati cognitum eum lapidem fuiſſe,* Plinius auctor eſt, *nitrum frequenter liquatum cum* Sulphure *coqui in carbonibus, ſulphuri concoctum in lapidem verti. Hæc recognoſce* ex *lib.* 31. *cap.* 10. And the ſame *Author* ſaith elſewhere, *Præ aliis omnibus inclaruit* νίτρον ὀπτὸν *Hippocratis* ſeu *lapis* Plinii *nitrarius, dictus a barbarorum pruna ſeu angina, cui ſingulariter mederi perhibetur. Nec nova eſt quæcunque ea laus. Nam & Hippocrates abſtergendæ Salivæ & muco, ac facilitandæ exſcreationi nitrum anginoſis obtulit, inditque*

G Bellichius obſerv. chym. l. 1. c. 5. p 49.

G Bellichius ib l. 2. c. 3. p 119.

ditque collationibus Oris. Lib. 2. de morbis, sect. 49.

Neither is the way of *subliming Flowers of Benzoin*, any thing else then the imitation of that way which the *Ancients* had of condensing *Soot*. So *Bellichius* informs me, *Fuligo, definiente Scaligero, cujusque rei pinguis crematilis pars est, ac demum aliarum rerum fumus condensatus, Exerc. 56. Modus conficiendæ ejus, siquid artificii subest, apud Dioscoriden extat*, lib. 1. c. 85, 86, 94, 97. *imitatio apud Beguinum, quando Benzoinum defloravit*, l. 2. c. 18. *Id ibid. l. 1. c. 2. p. 31.*

It may perhaps be granted by most intelligent persons, that the making of Extracts, and *fixed Salts*, and such instances of *Vegetables* being *prepared* as I have given, and the *glory of those inventions* cannot justly be denied unto those *disputing Ages*; but that the *preparation of Minerals*, and the *medicinal use* of them *inwardly*, is a discovery the ancient times were not acquainted with. And this is the judgment of many *learned* men. But in refutation of it, seeing that the inward use of *Antimony*, as it is several ways prepared, refers to *Basilius Valentinus*, and before *his* days; since that, sundry preparations of *Mercury* are more *ancient* then the humour of *Novellism*; since *Paracelsus, Hartman, Crollius* did but publish the processes of *Aristoteleans, Avicennists*, and such like *Monks* and *Physicians*; all that our *Virtuoso* can derive from this *Plea* is, that the *Arabians*, adherents to the old *Philosophy* and their *followers*, did improve the *extent* of *Chymistry*, and added thereunto as they did in the other *practice of Physick*, the use of *Rhubarb, Cassia, Manna, Tamarinds*, and other benign medicines: and this demonstrates *that Philosophy* and *those notions* not to be so *steril*, as they are represented in comparison of the *Fecundity of the Cartesian Principles*, from whence *Physick* hath received *little* (if any) *benefit* or advantage. But to raise this Enquiry beyond the times of the *Saracen* Empire, it is manifest out of *Pliny*, that *mineral* waters were drunk in those ancient times: and that the *Stomoma* or *rust of iron*, as also that drinks in which *iron* was quenched, was given in the time of *Dioscorides* and *Galen*. That *Brimstone* was given inwardly by *Hippocrates* to *asthmatick* persons. That the *Squamma* *Dioſc. l. 5. c. 53.* *Galen. l. 1. de cuporist. c. 17.*

æris

Hippocr. de vict. in morb. acut.
Vide *Doring.* de medicina, p. 217. *Ruland.* progymn. qu. 20. *Brassavol.* de med. purg. p. 177. *Foterius.* Pharmacop. Spagir. l. 2. c. 6.

æris was given inwardly, as a *purge* and *vomit* by *Hippocrates*, *Galen*, *Dioscorides* and *Celsus*: and the Experiment happily tried by *Brassavolus*, that great *Experimentator* again of later years. So the giving of *Sandaracha*, or *Orpiment* inwardly for old coughs; and the *suffiment* made out of it, are recorded by *Dioscorides*: the trochises of it recommended anew by *Mesue*, and the more modern trials in *Riverius*. Even *Chalcitis* is an ingredient in the ancient *Treacle* of *Andromachus*. I shall conclude all with the passage of *Doringius* in the place already cited, *Præter Sandarachum Isidorus, Athenæus, Idius, Eubulus, Heras, Gemellus, Agathius, Nicostratus, Menander, Thanyros, Deletius Epagathus, Asclepiades, & alii: Alumen scissum, Auripigmentum, Æris squammam, Æs ustum, Calcem vivam, Sulphur vivum, fæces unde ustas, Cadmiam, Cerussam, Gypsum, Stibium sive Antimonium in pastillos redacta dysentericis præscripserunt: quorum præparandi rationem & utendi modum vide apud Galenum lib. 9. de compos. med. sec. loc. c. 5.* Out of which passages any Reader will guess what President *later Authors* had out of the more remote *Ancients* for the giving *minerals* inwardly; and if we are just to the *Arabians* and their followers, we shall scarcely allow them any further honour, then to have found out some *new ways to serve up old dishes.*

Doring. de medic. & med. p. 219. Vide & *Ruland.* progymn. *Alch.* qu. 20.

I shall adde, that in *Egypt*, at such time as the repute of the *Egyptian Priests*, and their *phantastical Philosophy* had given way to the followers of *Hippocrates*, *Aristotle*, *Herophilus*, and others, that introduced the *Grecian* Learning there, that is, in, and somewhat before the days of *Diocletian*, the *Egyptians* were *Masters* of that Secret of *making Gold*, which our inquisitive *Moderns* have so *vainly* sought after. Before that Age there is no mention of it, and then it is said they had such knowledge of the Art *of making Gold*, that thereby they were enriched and impowered to make War upon the *Romans*; and being overcome by the Emperour *Diocletian*, he burned all the books which they had, containing the Mysteries of *that Art*, to prevent any future commotions of that Nature. So *Suidas* in the word Χημεία, ἡ τοῦ χρυσοῦ καὶ ἀργύρου κατασκευή· ἣν τὰ βιβλία διεφθει-

νησάμενος ὁ Διοκλητιανὸς, ἔκαυσε διὰ τὰ νεωτερισθέντα Αἰγυπτίοις. And in the word Διοκλητιανὸς he says, ὁ δὲ καὶ τὰ περὶ χημείας χρυσοῦ καὶ αργύρου τοῖς παλιαοῖς γεγραμμένα βιβλία διερευνησάμενος ἔκαυσε πρὸς τὸ μηκέτι πλοῦτον Αἰγυπτίοις ἐκ τοῦ τοιαύτης προσγίνεσθαι τέχνης, μηδὲ χρημάτων αὐτοὺς θαρροῦντας περιουσία τοῦ λοιποῦ Ῥωμαίοις ἀνταίρειν. The renown of this *Story* is not questioned by the *Chymists*, and I finde the learned *Joannes Langius* to give credit unto it, quoting for the truth of it in his margin, besides *Suidas*; *Orosius* l.7. c.16. And *Paulus Diaconus* in the life of *Diocletian*: Neither doth *Libavius* or *Rolfincius* elevate the authority thereof, though *he* mention the passage of *Suidas*. And to give a further colour unto this relation, I am informed that *Æneas Gazæus*, who lived in the latter end of the fifth Century, when *Zeno* and *Anastasius* were Emperours, treating of the Resurrection, hath this passage, Παρ' ἡμῖν οἱ πρὸς τὴν ὕλην σοφοὶ, ἄργυρον καὶ κατ' τίτερον παραλαβόντες, καὶ τὸ εἶδος ἀφανίσαντες ἐπὶ τὸ σεμνότερον μεταλαβόντες τὴν ὕλην, χρυσὸν κάλλιστον ἐποίησαν. But these *Narrations* are rejected by such as deny that other *metalls* may be *transmuted into Gold*: It is replied by *Erastus*, that either those *Egyptian* books contained nothing but the Art of *melting down of metalls*, and separating the *latent Gold* therefrom: or that *Suidas* being a *late writer*, living but 500 years ago, about 800 years or more after *Diocletian*, might have been imposed upon by the *Chymists* of *those* times (in *Greece*, and during the *disputing Ages*! mark that Mr. *Glanvill*) who even then might have *feigned* some such *stories* as *that* (and the Allegorising of the *Golden Fleece*) just as they have within the *last Centuries* counterfeited the Works of *Moses* and *Solomon*, and entitle *them* unto *their Fictions*. There are an infinity of *stories* in *Suidas*, which render his Assertions suspected: and in this he hath not the countenance of any *ancient* Writer to second *him*. It seems strange, that the *Romans* having so long ruled in *Egypt* absolutely, and their *Governours*, they not being to be supposed free from all desires of *gain*, how they should never apprehend the *Artifice*, nor have the least mention of it in *their* Writers

Joan. Langii Ep.med. l.1. ep.53. de Orig. Alchym. *But* Oros. *and* Paulus Diaconus *were* credulous *Writers, and of* little repute. *Libavius* in exam. censur. *Parisiens.* *Rolfincius* chym. Art. redact l. 1 10. & *Conring.* de m. *Herm.* c 3. 21. *Erastus* de metallis, p. 103.

Conring de med. *Herm.* c.3 p.23.

(*Greek* or *Latine*) till the end of the *fourth Century*: and that ſo remarkable a paſſage as this is ſhould be omitted by thoſe *ancient Writers*, who relate both the *war* and actings of *Diocletian* after his victory. As for that ſaying of *Ænaas Gazæus*, it is replied that he ſpeaks by *hear-ſay*, rather then *certain knowledge* of the *operation*: that there have not wanted many learned perſons, who have with a great deal of *confidence*, illuſtrated the *Reſurrection* by contemplations of the *Phœnix*, and of the *forms* of Plants reſuſcitated in their ſeveral *Salts*, as if *both* were *realities*: yet is there no ſuch thing as either the *one* or the *other*.

Id ib p. 22.

De plant. reſuſcit. vide *Bellich.* Theſſal. red. v. c. 7. *Rolfinc.* art. chym. l. 6. c. 3. & l. 7. c. 19.

Out of all which it is *evident* that *Chymiſtry* was a practice *known* and in *uſe* among the *Sectators* of *Ariſtotle*: and that the *Grecian* and *diſputing Ages* were not unacquainted with *thoſe Proceſſes*, though theſe *latter times* have been more *various* and *inquiſitive*, and have reduced that *Art* into better *Method*, and enlarged the Practice of *Phyſick*, with an infinity of *Medicines*: and indeed we muſt confeſs our ſelves very much obliged by the labours of ingenious *Chymiſts*, and that they have afforded multitudes of *Experiments*, ſuch as contribute to the *delight* of all *Philoſophical* heads, and to the *Cure* of *many* that *being ſick*, have either *better opinion* of *Chymical* Medicines then of *others*, or are *pleaſed* with their *ſmall*, and commonly more *pleaſant doſe*.

See this largly diſputed by Libavius in exam. cenſur. Pariſienſ.

But that thoſe parts into which *Chymiſts* reduce things, are *latent* in the compound body, otherwiſe then by the *Ariſtotelean* diſtinction of *formaliter* and *materialiter* (ſo much laughed at by Mr. *Glanvill*, pag. 119.) This is an *Aſſertion* which doth not become any man that pretends to have read Mr. *Boyle* in his *Sceptical* Chymiſt, where that Point is too amply debated to be here tranſcribed. or ever (I think) *refuted*. Having denied Mr. *Glanvill*, that *by thoſe uſeful and luciferous proceſſes, Nature is unwound and reſolved into the minute Rudiments of its compoſition*. Which *Rudiments* were not made uſe of at the firſt *Creation*, when one *Fiat* created thoſe *compound bodies*, which *Artful Fires* ſometimes (and but ſometimes) *analyſe* into *ſeveral parts*, as *Salts*, *Oyle*, or *Sulphur* and *Spirit*, and thoſe groſſer *Elements* of *Earth* and

Vide *Kerger.* de fermentat. ſect 1. c. 3. p. 10. & *Rolfinc.* chym. in art. red. l. 1. c. 19. *Conring.* de med. *Hermet.* c 22.

and *water*. All which are *not found* in *many* bodies, (and when they are, it is with a *great diſcrepancy* betwixt thoſe of one Concrete, and thoſe of *another*) nor any of them to be ſeparated from *Gold*. " Which *Libavius*, no, nor Dr. *Willis* doth not make to be the *laſt unmixt*, and *ſimple Conſtituents of natural bodies*, *ſed ejuſmodi tantum ſubſtantias, in quas veluti partes ultimo ſenſibiles res Phyſicæ reſolvuntur*: Subſtances into which natural bodies are reſolved finally as far as *ſenſe* can judge, and when the *Analyſis* is proſecuted in *one ſort* of procedure: for *another method*, different *Solvents*, and different *Fires* diſcover *different* parts, and thoſe *ſenſible* too from what the uſual *Chymiſtry* builds upon. Having denied him this, I muſt further tell him, that when the *Countreywoman* ſets her *Eggs* to be *hatched*, ſhe produceth by *thoſe means* ſuch *bodies* as no *Chymical* fires with their *vexatious Analyſis* ever would diſcover: ſo ſhe doth when ſhe doth *brew* and *churms* her *butter*. Nor is this more evident, then it is clear that the *Chymical principles*, when they come to be accommodated to the ſolving of the *Phænomena* in *nature*, or in *diſeaſes*, have as much of *darkneſs* and *diſſatisfaction* in *them*, as occurs in the *Peripatetick* way: ſo that now we are more *dubious*, not more *knowing*, then *before*: and this any man that hath conſidered how the *Chymical* Phyſicians diſagree about the cauſes of *diſeaſes*, and even about the common *Phænomena* of *Nature*, will eaſily grant me: nor will it appear leſs manifeſt, that if the *Chymical hypotheſes* do take place, that it will ſubject the *Mechanick Philoſophy*, and eſtabliſh that of *Anaximander*, revived by the ingenious *Berigardus*.

De ferment. c 1. p. 4.

But Mr. *Glanvill* adds, "*That* Chymiſtry *directs Medi-* "*cines leſs* lothſom, *and far more* vigorous, *and freeth the ſpi-* "*rits and purer parts from the* clogging *and* noxious *appen-* "*dices of* groſſer *matter*, which not only *hinder* and *diſable* "the *operation*, *but leave hurtful* dregs *in the body behind* "*them*.— This Plea for the preferring *CHYMICAL* Medicines before thoſe commonly called *Galenical*, is much inſiſted on by *Beguinus*, *Quercetanus*, and others of *that* way. *Yet*, firſt it is obſervable, that whether we regard *taſte* or

Plus ultra, p. 11.

ſmell, thoſe very *Authors* recommend as *odious medicaments*, and as *loathſom*, as ever *Cœrdus* or *Foeſius* in their *Diſpenſatories*, if not *worſe*. Will any man *in his Wits* condemn *Wormwood* and *Centory* becauſe of their *bitter taſte*, or *Caſtoreum* for the *ſmell*? Secondly, every thing is not the *better* for being *extracted*. Thus the *Extract* of *Rhubarb*, though quickned with its *Salt*, is not ſo *efficacious* as plain *Rhubarb*, except it be ſophiſticated with *Diagridium*. Nor is *Cynnamom* improved by *Extraction*. Their being more *vigorous* and freed from groſſer parts is not *always* a commendation, and *ſometimes* it carries danger with it. That thoſe *groſſer* parts, and thoſe natural vehicles are requiſite, ſeems even thence clear, that their ſpirits & eſſences muſt be tempered and mixed often with other *groſs bodies* before they be given. Thoſe *appendices of groſſer matter* are not always *noxious* to *Nature*, ſince in our *meats* we finde none to be able to *live* on *Chymical viands*, but good *Kitchin-Preparations*. How many ways are there of preparing *Harts-horn*, yet is there *not one* that equalls the *crude Horn*. I ſhall ſet down *Zwelfers* words, whoſe credit no *Chymiſt* almoſt will extenuate. *Licet ex cornibus vel oſſibus ita Philoſophice calcinatis diſtillationi ſubjectis de ſpiritu ſale volatili, & oleo ipſorum fœtido nonnihil eliciatur, non tamen propterea exiſtimandum ipſa adhuc iiſdem quibus crudum cornu pollere viribus vel majoribus etiam (prout nonnulli ſibi imaginantur & aſſerunt) vel etiam, ut alii arbitrantur, hac calcinatione nihil aliud peractum fuiſſe quam quod friabilia, ad pulverandum aptiora, & magis pura reddita ſunt: Neutiquam, Quippe, qui ambo cornua, tam crudum quam Philoſophice calcinatum, examini ignis ſubjiciet, reipſa deprehendet multum de nativa ſua humiditate, de ſale volatili & oleo huic cornu Philoſophice calcinato detractum eſſe, & eorundem vix parte quarta adhuc gaudere, ut propterea & hanc calcinationem Philoſophicam, licet totali exuſtione aliquanto meliorem, approbare nequeam: e contra vero ipſum crudum cervi cornu ſubtiliter & minutim raſpatum pluris æſtimem, quod tamen diverſimode parari,*

Freitag. noſt. med. c. 75. p. 325.

See Mr. Boyle of the uſefulneſs of Philoſ. part 2 p. 148, &c.

See this point fully debated in the Vulgar Errors of Primroſe, *l. 4. c 3. which I deſire Mr.* Glanvill *to read.*

In Pharmacop. Auguſt. De CC philoſophice calcinat. p. 805.

In proſecution of this point let any man conſider, that Chymical oyle of Anniſeeds *is not ſo effectual as the powder.* Heurn. meth. adv. l. 1. c. 5. *Nor doth the like oyle of* Camomile *equal the* infuſion, *as* Simon Pauli Cl. quadrip. p. 255. practically *obſerved. So the common* Pillute de ſuccino *and* Franckfort-pills *tranſcend the minute doſes of divers and the moſt famed* Pau-

parari, inque virtutibus ſuis exaltari poteſt. Ut vel in ſubſtantia, forma nimirum pulveris, vel in aqua decoctum & in mucilaginem vel gelatinam converſam tuto & ſine nauſea propinari poſſit. Nor is this more true in *Harts-horn* than in *Vipers*, which are more effectual being eaten as *Eeles*, or by a *common infuſion* in wine, or given in *powder* (*plain powder*) then when reduced to *volatile Salt* and *Eſſences*. It is alſo falſe, that *Chymical* preparation always *amends*, or doth not render *ſome* things *worſe*: The ingredients of *ſublimated Mercury* are not *poiſon*; the *reſult* is. How much is the nature of *Antimony* and *Mercury* altered by preparing, ſo that a *few grains* prove *mortal* to the taker, who might without *prejudice* devour *great quantities* of either of *them* unprepared, *Hydrargyrus, Antimonium crudum larga ſæpius porriguntur*: The infuſion of *crude Antimony*, (a pound in four Gallons of *Ale*) often rectifies all *impurities of the blood*, as well any *viper-wine*: and *Mercury*, which being crude is not only given in Pills by ſundry *Phyſicians*, but drunk without any hurt in greater or leſſer quantities in ſeveral caſes. *Non deſunt qui Mercurium crudum in dolioli fundo detinent, ferunt vinum ne areſcat, aut vaporem contrahat, aut pendulum fiat, ea ratione fieri. Nos tale vinum ad ventris lumbricos plurimum valere certo ſcimus.* As for the hurtful dregs which the Galenical Medicaments are ſaid to leave behind: I am confident, that whoſoever ſhall enquire into the ill conſequences of the two *Pharmaceutics*, will ſay, that if the *Galenical* be not always the moſt *efficacious*, it is *always* the moſt *ſafe* and *innocent*: and any man will be more apt to *dread* the *violent impreſſions* which the *powerful ſpirits* and *minerals* may make upon the *membranes* of the *Stomach* (which may introduce an *irrelievable* diſtemper in the *torenus* of *that part*, whereupon depends the *nutriment*, *health*, and *vigour* of the whole body) then any noxious *fæces* or *little* and *remediable* hurt from the generality of the *Galenical* Medicaments. *Qui Deum credit malefactorum vindicem ultoremque, is a noxiis medicamentis, cum ad manum ſunt alia, diligenter abſtinebit: ne quando homicidii,*

chymagoga. *This is an obſervation ſo* common *with all* practitioners, *that none but* Mountebanks *and* Quacks *can deny it.* Crato, Steeghius, Hofman, *and others, generally taking notice of it.*

M. *Ruland.* progymn. *Alchym. qu.* 33.

Poterius Pharmacop. Spagir. l. 1. p. 352. *This experiment is not down in the two Treatiſes of the* Vintoſi *about the* ſophiſtication of wines: *but in ſhort, thoſe pieces* (*as much as they are famed before they came out*) *have been laughed at by all knowing perſons and* Wine-coopers.

accu-

accusante conscientia, reus fiat, parum profuerit novendecim curasse periculoso curationis genere, quo vigesimus, aut trigesimus sit necatus. Eraſtus disp. de propr. medic. c.65. And there is this to be ſaid in *Juſtification* of *that Courſe*——that thoſe who have moſt *decried it*, and raiſed their repute upon a *different* way, yet have *practiſed* with *it*. *In ipſius Paracelſi ſcriptis paſſim laudantur remedia morborum vulgari modo & compoſita & præparata. Etiam Petrus Severinus teſte Paludano, Medicamentis Paracelſicis non ſemper uſus eſt, verum & compoſitionibus Galenicis ſæpe.* Nor are *Paracelſus & Petrus Severinus Danus* ſingular in *this action*: it is the common uſage of *Quercetan, Crollius*, and *Hartman*; not to mention Dr. *Willis*: I ſhall adde, that *Chymical* medicines have never or very ſeldom anſwered their *expectation*, which men raiſe of *them*: and whoſoever ſhall inquire into the credit which *Paracelſus, Petrus Severinus, Phedro*, or *Scheunemannus*, or *Helmont* gained by theſe *refined Medicaments*, he ſhall obſerve that either *they* are infamous for their *deſtructive* courſes of *Phyſick*, or at beſt atchieved nothing beyond other *Mortals*, except by *Chance*. In fine, though I have ſeen very *good ſucceſs* of many *Chymical* Medicines; yet dare I not expreſs ſo great an *admiration* for them as Mr. *Glanvill* declares: and if *he* in all the *number* of his *Philoſophick* friends, had but *one* underſtanding *Phyſician*, or *two*, they would tell him, That there are ſome diſeaſes *in themſelves*, or *by accident* incurable; that men will die under the moſt able *Phyſicians*, and that the moſt *beſt* and *innocent Phyſick* will *ſometimes* have effects *different* from the *wiſhes* and hopes of the *Doctor*: and he would finde that by *ordinary medicaments not purged from their dregs*,, nor exalted into *ſpirits* and *eſſences*, as *great Cures* are done by *Countrey-Phyſicians* and *Coun-*

Conring. de med. *Herm.* c.21.p.209. *Paludan.* epiſt. ad *H. Smet.* Ea habetur in *Bartholini* cista med. in vita *Severini*, p. 127.

Vide *Conring.* de med. *Herm.* c. 21 p.358.&c. de *Paracelſo*, de *Phedrone*, & Pharmacis *Paracelſicis* vide *Bernardum Diſſennium Croneburgium* in def med. veter.c.40,41,&c. & de *Petro Severino Dano*. Vide epiſtolam *Paludani*, ubi ſupra. De *Scheunemanno* vide *Rolfinc.* chym.l.1.c.18.p.51.

Nec *Paracelſi* ſectatores probo, qui medicina *dogmatica* exploſa & relicta, *Elixir vitæ, quintas eſſentias, Axungiam Solis & Lunæ*, &c. & alia pernicioſa & deterrima pharmaca in parva doſi, magno cum ſupercilio exhibere ſolent, ægrorum palato conſulere volentes: cum hoc titulo tenus ſalrem medicamenta ſint, ipſorum quidem opinione ſingularia, revera autem *mortis fercula & pocula*, quibus plerumque corpus humanum vehementer exagitatur, & magna cum jactatione fatigatur, & ita debilitatur, ut aut ære aut nunquam amplius, priſtinas vires recuperet. *Gabelchover.* Cent.6.hiſt.7.in annot.p.24.

Countrey-Gentlewomen oftentimes, as any ever were wrought by *Chymistry*. The Phyſick which is celebrated in the Scripture, that which *St. Luke*, St. *James*, *Coſmas* and *Damianus*, *Joannes Damaſcenus*, and *others* followed, was that which our *Divine* ſcruples, at leaſt it leaves *dregs in the body*.

I confeſs that among the *Egyptians*, and *Arabians*, and *Paracelſians*, and ſome other Moderns, *Chymiſtry* was very *fantaſtick*, *unintelligible* and *deluſive*; and the *boaſts*, *vanity*, and *canting* of thoſe *Spagyriſts* brought a *ſcandal* upon the *Art*, and expoſed it to *ſuſpicion* and *contempt*: but what the *Society* have done in order to its *improvement*, I underſtand not ſo well as Mr. *Glanvill* ſeems to do: the Treatiſe of Dr. *Willis* about *Fermentation* was writ before he was of that number: and I know not how he hath improved *Chymiſtry* much ſince. And in that famed *Piece*, all is not to be reckoned upon as *invented* (much leſs is *improved*) that is *written*. Thoſe that have *improved* it moſt, and made it *intelligible*, are *Beguinus*, *Crollius*, *Quercetan*, *Hartman*, *Angelus Sala*, *Schroder*, *Zwelfer*, *Sennertus*, *Glauber*, and others, that never converſed with the *Society*, whoſe *Improvements* are not *mentioned* by Mr. *Glanvill*, though ſo *great*, that (conſidering what men now write or do, is but by their *Example*, and after they had removed away all difficulties) all that our *Inventors* have done, doth not *deſerve to be mentioned*.

His notion of Fermentation, *as thereby he expreſſeth the* natural *and* præternatural *occurrences in our bodies, is taken from* Bellich. de fermentat. ſect. 8. *His notion of the* fire in the heart *it very near related to the doctrine of* Conringius de calido innato; *and the compariſon of the* bloud *with* wine *is derived from* Carolus Pilo. *ſo that thoſe things (which are the principal in his book) ſeem rather* illuſtrated excellently well, *then* new diſcoveries *and* Hypotheſes.

I ſhall adde, that we owe not only the *invention*, and rude improvement of Chymiſtry to the *Diſputative* followers of *Hippocrates*, *Ariſtotle*, *Galen*, thoſe *ſuperſtitious Porers upon the Writings of the Ancients*, thoſe ridiculous *Schoolmen*, and *Monks*, and *Phyſicians*, but even the *preſent credit* and *eſteem* which it hath in the *world*, and upon which it hath ſo farre *advanced* it ſelf. It was not *Paracelſus* with all his *noiſe* and *Inſolence*, but the *Dogmatical Phyſicians*, who obſerving the benefit thereof in *Pharmacy* gave it *fame*, and introduced

troduced it into the *Shops*, and *Cabinets* of *Princes*, and the use of *serious* and *considerate* Persons. *Crato* introduced it into the *Emperours Court* at *Vienna*: not a *Chymical* Oyle, or *Extract* was prepared there, till he gave *Encouragement* to the thing. So did *Erastus*, a greater enemy to *Paracelsus* than to *Chymical Physick*: as appears by that saying which he uttered in the midst of his *Disputes* and animosities against the *Paracelsians*. *Equidem ne absoluta est Ars nostra sine distillatoria.* And had not *Langius*, *Auderna-cus*, *Gesnerus*, *Fernelius*, *Zwingerus*, *Schegkius*, *Augenius*, *Minadous*, *Matthiolus*, *Libavius*, and many other *Physicians* of the *Hippocratical* way introduced the *sober* and *honest practice* of it, and rendred it *helpful to common life*, perhaps our *Virtuosi* had never medled with it, at least not have been *able to give it any esteem in the world.* But now that the *Galenists* and *Aristoteleans*, (as they are commonly called) have refined it from its *dross*, and cast off the *Chrysopoietick* and *delusory designs*, and *magical intermixtures*, and *Rosicrucian vapours* and *superstitions*, all which *they* effected; and gave Mr. *Glanvill* the opportunity of this *Cant*, with which I conclude this discourse.

Crato medicin. ep 137. *Erast.* adv. *Paracel.* part. 4 p. 285. & de metall. p. 8.

Sennert de consc. chym. c. 2.

Mr. *Glanvill*, p. 12.

"*I confess*, Sir, *that among the* Egyptians, *and* Arabians, "*and* Paracelsians, *and some other* Moderns, Chymistry *was* "*very* phantastick, *and* unintelligible, *and* delusive: *and the* "boasts, vanity, *and* cantings *of those* Spagyrists *brought a* "*Scandal upon the* Art, *and exposed it to* suspicion *and* con-"tempt. *But its late* Cultivators, *and particularly the* ROY-"*ALL SOCIETY have refined it from its* dross, *and made it* "honest, sober, *and intelligible, an excellent* Interpreter "*to* Philosophy, *and help to common life. For they have laid* "*aside the* Chrysopoietick, *and* delusory designs, *and* vain "transmutations, *and* Rosicrucian vapors, *Magical* Charms "*and* superstitious suggestions, *and formed it into an* instru-"ment *to know the* Depths *and* Efficacies *of Nature.* —— All this *without dispute* the *Society* hath done; and *without disputing*. And *hereupon* I do agree with our *Virtuoso*, that *they have no small advantage above the old Philosophers of the Notional way.*

Perhaps not so delusory *as Mr.* Glanvill *thinks: but I am sure the* projects *some go upon are* delusory, *have much of the* Rosicrusian *humour in them: and the design of introducing a* sensible Philosophy *is the pretence of* Crollius, *and of the* Rosicrusive *Order.*

Of

Of Anatomical Improvements.

"WE *have another* advantage *above the* Ancients *in* "*the* ſtudy, uſe, *and vaſt* Improvements *of* Ana- "tomy, *which we find as* needful *to be* known *a-* "*mong* us, *as 'tis wonderful 'twas* known *ſo little among the* "Ancients, *whom a fond* Superſtition *deterr'd from* diſſecti- "ons. *For the* Anatomiſing *the* bodies *of* men *was counted* "barbarous *and* inhumane *in elder Times*: *And I obſerve* "*from a* learned man *of our own, that the* Romans *held it* "*unlawful to look on the* Entrails. *And* Tertullian *ſeverely* "*cenſures an* inquiſitive Phyſician *of* his time *for this pra-* "*ctice, ſaying, That* he hated man, that he might know him. "*Yea, one of the Popes* (*I take it 'twas* Boniface 8.) *threatens* "*to* excommunicate *thoſe that ſhould do any thing of this* "then-abominable *nature. And* Democritus *was fain to ex-* "*cuſe his* diſſection *of* Beaſts, *even to the great* Hippocrates. "*Nor does it appear by any thing extant in the writings of* Ga- "len, *that* that *other* Father of Phyſicians *ever made any* "Anatomy *of* humane *bodies. Thus ſhy and unacquainted was* "Antiquity *with this* excellent Art, *which is one of the* moſt "uſeful *in humane life, and tends mightily to the* eviſcerating "*of* Nature, *and diſcloſure of the Springs of its Mo-* "*tion.* *Plus n'tra*, p. 12.

I have ſet down without any interruption the words of *this* Engliſh *Bravo* and *Hector* of *four Modern Philoſophers*, that my Reader might come with a *greater expectation* to the peruſal of my *Animadverſions*: ſo high a charge of *ignorance* upon the *Ancients*, ſuch *uſeful diſcoveries* of the *Moderns* render the *former* to be contemptible *fellows*,

and the latter a very *beneficial* and *important party* in this *Age*. But if it do appear that the *Moderns* have not as yet convinced us by their *works* and *great performances* in *Phyſick*, that the knowledge of theſe *new inventions* is ſo neceſſary to *Phyſicians*, and ſo *advantageous* to *mankind*, but that thoſe which either *ſlight* or *ignore* their *diſcoveries*, acquire a *greater* repute, are *more* employed and poſſeſſed of a *more honourable* and *gainful practice*, and, in fine, do *greater Cures* in general, then our *Braggadochios*; then is there no ſuch reaſon for *this Triumph* of Mr. *Glanvill*, as he imagines. The better to judge hereof, I deſire all conſidering men to look back upon the ſeveral *Phyſicians*, who have flouriſhed in *Greece*, *Rome* and *Barbary*, and to view the preſent ſtate of *Phyſick* in *Italy*, *Spain*, and *France*, and try his moſt *ſevere judgement* if it be poſſible for him to condemn that *Phyſick* as *imperfect* and *pitifully deficient*, which gave that credit to *Hippocrates*, *Galen*, *Rhaſes*, *Avicenne*, *Fernelius*, *Lacuna*, *Mercatus*, *Valleſius*, *Chriſtophorus*, and *Thomas a Veiga*, *Claudinus*, *Maſſarius*, *Septalius*, *Rondeletius*, *Hollerius*, *Ballonius*, *Rodericus a Caſtro*, *Fonſeca*, *Saxonia*, *Sennertus*, *Crato*, *Proſper Alpinus*, *Antonius Muſa Baſavola*, *Hofman*, and many others whom I ſhall not name; as indeed I name theſe without any order) which *they* now enjoy. Let him ſet his moſt *ambitious thoughts* on work, and ſee if he can propoſe to his *deſires* greater things then they attained unto, and atchieved. Let him employ all his *envy*, and yet condemn their *Diagnoſticks*, *Prognoſticks*, or that *Secretorum Secretiſſimum*, their *method of curing*, and their *Medicines*. If there be *little* or *no fault* in *theſe parts*, it ſignifies not much what *principles* they went upon in *Philoſophy*, nor whether they did *miſtake* or *ignore* ſome things in *Anatomy*, as long as they were not *ſuch* as hindred a *Phyſician* from the obtaining of that *end* which is deſigned by his *Art*: And as to the improvement of the *Therapeutick* part of *Phyſick*, by *new Medicaments*, or *new* and *more pleaſant* preparations of *old Medicaments*, if they be *no more efficacious* then the *former*, we pay to the *Inventors* thoſe acknowledgements, which we do to the introducers of *new garbs* and *faſhions of clothes*, the

beſt

best contrivances whereof, howsoever they may *excel in conveniency*, cannot be endeared unto us by the representations of being *necessary*. I have named *practical Physicians*; I shall now instance in *Chirurgery*: What man is there in this Age, that would not be content with the repute of *Ingrassias, Vesalius, Fallopius, Carcanus, Aquapendens, Spigelius, Marchettis, Severinus Paræus, Chalmetæus, Pigræus, Guillemeau, Hildanus, &c?* or what man is there in this *inquisitive Age*, that any sober man would compare with *them*, much less *prefer* before *them?* If the Posture of *Physick* be such, and that the value we ought to place on every thing be to be regulated by its *subserviency* and *conduciveness* to some end, (*finis conciliat mediis gratiam*) it is easie to judge what *certain esteem* we are to put upon the *modern Improvements of Knowledge* in order to *Physick*, and how far we may justly censure the *Ancients*, and such as either *slight* or are *ignorant* of *them*. I profess my self not to know what disease it is that the *Virtuosi* cure *better*, or with *more certainty* then those that follow those other of the *Dogmatical* way. If it were *done*, there would not want such as should cry such *performances* up; besides the interest of the *Novellists*, the sence of their *great Cures*, would gain them all the practice that is now in the hands of such as vary not from the *ancient Method*, and *Rules of that Art*. I shall adde, that I could demonstrate by *undeniable testimonies*, and such as are confirmed by *modern trials*, that the introducing of *new Medicines*, either *Chymical*, or *otherwise*, and the neglect of a *diffused reading*, hath occasioned the *disuse* and ignorance of several *Medicines* for *Consumptions*, the *Gout*, *Plague*, and other grievous diseases, which might be attempted with much more *assurance*, then is to be placed upon the *later Methods*. To prosecute this point further, *I* shall tell you, that *Physicians* hitherto looked with a great *indifference* upon the *Principles of natural Philosophy*, whether they were *true*, or *no*; so that they did but serve as convenient *Memorials* to regulate them in their *practice*, and that *they* did guide them to their wished *end* with *such certainty*, as if they were *true*. All *disputes* about *Natural Philosophy* that did not refer to

practice, they looked upon as *Curiosities*, going beyond their *Art*, and about which they would not contend, so as that the *Method of curing* were not undermined thereby. Upon this account they did allow of two sorts of *Truth*, the one in *Physick*, the other in *Natural Philosophy*, and that what was *such* in *one*, might not be *such* in the *other*. This *President* they derived from their great Master, *Hippocrates*, who in his discourses sometimes proceeds upon the *Doctrine of the four Elements*, as if that were *true*: Sometimes he goes upon the *doctrine of Atomes*, as if he regulated his *Cures* thereby: sometimes he seems to favour the Tenets of the *Chymists*; and he cries out as Mr. *Boyle*, and other *Chymists* cite him, *Non calidum, frigidum, humidum, siccum esse quod maximam vim agendi habet in corpore, verum amarum, & falsum, & dulce, & acidum, &c.* Somtimes he proceeds as it were upon the principles of the old *Methodists*, and ascribes the origin of diseases to the *altering of the texture of the body*, to the *different conformation of parts*, the *different configuration of pores, &c.* This was the course that *Great Man* took: he was willing to observe in all diseases the *motions* and the *course Nature* took; to take those for *ill signs* and *symptoms*, which he found to be such from that *great Instructor*; however ἀπαίδευτος καὶ ἐμαθοῦσα, those ways whereby *Nature* did *usually terminate* diseases, were the ways he thought they *ought* to be terminated by; and he made that the *scope* to be aimed at in the *curing* of *diseases*: those *evacuations* that had helped *naturally* to cure, he endeavoured to promote *artificially*, by such *Medicines* as *Experience* shewed to be serviceable to *those ends*, when administred at *due times* and *seasons*. In *short*, he made himself absolutely the *slave* of *Nature*, attended on *her motions*, sometimes gently *leading* her on, as it were a *Gentleman-Usher*; sometimes *following* her, as a *Page*, never pretending to *command her* by his *Medicines*: So cautious he was, that he would not adventure to *do good unseasonably*, and at other houres then his *Teacher* directed him, lest he should *do harm*: he would not adventure to *shorten* a disease, lest he should *shorten* his *Patients life*. As if he had foreseen the truth of that observation, which *Vallesius*, and others in these days experiment, *Celerior*

quam

See Otto Tachenius's Hippocrates redivivus, *and his* Clavis Medic. Hippocr. Devet. medic § 24 *Concerning the meaning of which place see* Erastus adv. Parac. p. 3. pag. 96. & Conring. de Hermet. med. c. 16 p. 191.

quam pro morbi longitudine curatio, detrahens plus virium quam pro morbi ratione, facit in tempore curandos ante tempus mori. Agreeable to this Method of *Hippocrates*, was that counsel which Dr. *Bathurst* (of *Black-friers*) gave me, when I first seriously set my self to study and observe his practice in *Physick*, viz. *Nunquam ille Medicus magnus erit, quisquis patitur sese principiis Philosophicis alligari atque constringi.* It is impossible for any person to be a *great Physician*, who ties up himself to one sort of *Natural Philosophy*, as if it were *really true* and *certain*: the operation of *Medicaments* is oftentimes such as answers not the *Principles* of any *Philosophy*, and the digestions of *Nature* are so different from those of *Chymistry*, her *fires*, her *solvents*, her *filters*, her *furnaces* & *vessels*, her *mixtures* and *degrees of heat* so *discrepant*, that there is no arguing from the *one* to the *other*: nor is there any thing to be *relied* upon in *Physick*, but an exact knowledge of *medicinal Phisiology* (founded upon *observation*, not *principles*) *semeiotics*, *method of curing*, and *tried*, (not *excogitated*, not *commanding*) *medicines*: where this course fails (as somtimes it will) we then try *uncertain Medicines*, rather then abandon the *Patient* to those *Prognosticks*, which are seldom so *fatal* as to destroy *all hope*; and where *Skill* is at a loss, we frequently behold *Chance* to be *successful*. And *this last* is the *Mystress* of our *Reforming Physicians*, it is under *her* conduct that *they* will enrich our *Therapeutick* part of *Medicine*, and alter our *Method*. I shal not enlarge further hereupon, being content to have shewed what esteem *Physicians* have had *Philosophy* in, and how they have had as little regard to the *truth* of their *principles in natural Philosophy*, as a man ought to have to the *hand of a Dial*, or which *points out the way to any place*: It is *not requisite* that it be a *real hand*, whatever men *call* it; nor would we endure the *impertinencies* of any that should go about to perswade us out of *our way*, because they that cald that an *hand*, were mistaken: In sum, so the *way* be *good* and *certain*, I am content to be one of those whom the *Italian* Proverb commends, for going that way which the *Mules* go. *Ito qua Muli eunt.* In this opinion I have amongst late Writers the learned *Hofman*, whose words are these, *Quæ enim necessitas est Medicum semper loqui cum Physico, siquidem usus, a quo pendet ars nostra, aliud velit, vel certe permittat? Quid enim ibi VERITAS est, hic UTILITAS est.*

Consultius esse nullus nescit tempore paulo longiore & tuto curari, quam paulo breviore cum certo vitæ periculo sanari. *Erastus* disput. de propriet. med. c. 65. sub finem.

Instit. med. l. 2. c. 2. §. 11, 12, &c. & Addend. 1.

Nor

Jo. Ant. Vander Linden *de circuitu sanguin. exercit. 1. sub finem.*

*N*or will it be amiss to propose the Judgment of the learned Practitioner *Joannes Antonides Vander Linden,* which he passed not long before his death at *Leiden* A.D.1659 after a mature consideration of all the *new speculations* in *Natural Philosophy,* which this *last Age* had produced and acquainted him with. "*Physici ab* imaginariis *incipiunt, per* ratio-"cinia *pergunt, & in* frivola *desinunt.* Cordatos *obtestor, an* "*apud se non* πᾶν ὑπόληψις? *Ad quid igitur* Physica, *ut nunc* "*constituta est,* Medico? *Etiam quæ nunc docetur* optima "(*præter quod* Principiis *nitatur* non necessariis, *& ob id* "certa *non sit*) *quid ad* medendnm, *si scitur,* utile; *aut, si* "*nescitur,* noxii *confert? Etiam, si extaret, quæ* absolute cer-"tis *principiis & perfectis regulis constaret, tamen* Medicinæ "*non esset, nisi* Institoria, *non* Institutoria. *Institoria, in-*"*quam; nam id* Medicis *est* Physica, *quod* Fabris *omne ge-*"*nus taberna mercium N*ovicarum. Instituriam *Medicinæ* "*qui volunt, næ illi sciunt, quid velit detritissimum,* ubi de-"sinit Physicus, ibi incipit Medicus. *Medicina non habet* "*opus* aliena; *nedum a* Physicis ficta *& emendicata prin-*"*cipia: habet* sua, *&* certa, *&* ausa stare *contra omnem* du-"bitationis *impetum. Qua fiducia concludo:* Physica ho-"dierna optima *Medicinæ parum aut nihil* utilis *est.* Qui "habet aures ad audiendum audiat, *mentemque sanam in* "*corpore sano habeat.* S*altem* vos, vos *iterum alloquor* χαριέ-"στατοι παῖδες, sapite; *& ab* ea *quæ* Medicinæ larva *se tegit,* "Physica *cavete; & hoc agite, ut quam aliquando salutis hu-*"*manæ præsidem* Artem *in* bona conscientia *vultis facere, eam* "*ante cum certo fructu* regia via *velitis discere.*

Upon this account I often laugh at our modern *Virtuosi,* when they dilate themselves with a great deal of *ostentation* and *confidence,* about the *qualities* and *correctives* of *Opium,* whether it be *hot* or *cold?* which controversie *how great soever,* hath no influence upon *practice,* because both agree pretty well in the cases in which it is to be *used,* and many of the *modern preparations* and *corrections* are *foolish,* and make it *worse;* And as to that *Laudanum* of *Helmonts* amongst the *Virtuosi;* I have seen much more *simple* preparations *stupifie less,* and produce *greater Cures,* then that did when

when made by the hands of one of the *Society*, and given by another of it: whilſt the beſt of *Modern Chymiſts*, *Zwelfer*; beſtows this commendation upon that old medicine of *Archigenes* and *Meſues*---*Erit ſic rite præparata opiata, quæ merito Laudani opiati, multarumque aliarum Opiatarum vices ſupplere poſſet.* I could enlarge here, but that Mr. *Glanvill* will think I have forgot *him*. *Pharmacop. Auguſt in conſ. Archigenis.*

Having made this general *Apology* for *Phyſicians*, which is ſufficient to juſtifie *them*, both as to their *care of their Patients*, and their *skill*; I ſhall come to apply my diſcourſe particularly to Mr. *Glanvill*. It is hard to reconcile the *neceſſity* of *Anatomy*, with the *Moſaical Conſtitutions*, it ſeeming ſtrange that *God* ſhould make it ſo *unclean* a thing for any one to *touch a dead body*, and yet the *knowledge of Sceletons* ſhould be ſo *neceſſary*. To ſupply this, the *Jewiſh Rabbins* ſay, that *God Almighty* did reveal unto *Moſes* the accurate knowledge of *Anatomy*: and when we conſider how *they embalmed* their *dead*, and that *embalming* doth infer a *knowledge of diſſection*, and of the *Entrails*; when we obſerve (out of *Buxtorfs Synagoga*) that artifice with which the *Jews* kill all *Animals*, thereby to let out the *blood* exactly: when we conſider that the multiplicity of *accidents* in *war*, or otherwiſe, would render the knowledge of the *inward* and *outward* parts *neceſſary* to them, and *experience* acquaint them with their *nature* (not to mention ſome *Jewiſh* relations about the opening of the *Os pubis* and the *partus Cæſareus*) I am apt to think that the *ancient Jews* were not ignorant of *uſeful Anatomy*, nor ſo *ſuperſtitious* as *totally* to avoid the *practice* of *it*; nor dare I ſay (with our *Virtuoſo*) ſuch *Superſtition* is *fond*, which is *aſcribed* to *God* as its *immediate Author*. *Vid.* Riolan. *Anthropogr. ph. l.* 1. *c.* 3.

As for the *Greeks*, the ſtudy of *Anatomy* was very ancient amongſt them, ſince it is attributed to *Alcmæon*, that ancient Phyſician (a Scholar of *Pythagoras*) as the firſt Author of it, if we will believe *Chalcidius* upon the *Timæus* of *Plato*. From *him* it was derived to poſterity by *tradition* and *manual operation*, children being bred up unto it, ſuch as were to be *Phyſicians*, as alſo *Philoſophers*. So *Democritus*, *Hippocra-*

tes,

tes, and many others came to be acquainted with it. But none of the *Ancients*, until the time of *Diocles Garyſtius*, did write any thing about it: which notwithſtanding, *that Science* ſeems to have been in never the worſe condition, as *Mercurialis* thinks. *Anatomen etſi a nullo veterum uſque ad Dioclis ætatem Scriptis mandatam referat Galen. in* 2. *de anat. admin. melius tamen ſic conſervatam & amplificatam inde intelligere poſſumus, quod tunc homines a primis annis Anatomen (ut cæteras artes,) non ex ſcriptis ſed ex Parentum ſermonibus ipſaque exercitatione addiſcebant; ſicque melius ipſam comparantes, non modo tenacius in animis ſervabant, verum etiam aſſiduis ſtudiis augebant.* But to put this queſtion more out of doubt, I ſhall appeal to *Galen*, who could give a better account of what they did in the *elder times* then Mr. *Glanvill*. I have not his Works by me; but *Lacuna* in his *Epitome* thus expreſſeth him. "*Quod veteres nihil ſcripſerint de conſectionibus adminiſtrandis, vertendum illis vitio non eſt: quandoquidem erat iis tum frequens tamque in communi uſu ipſa Anatome, ut domi apud Parentes etiam ab ipſa pueritia, in illa omnes olim exercerentur. Poſtea vero tam præclaro illo exercitio intermiſſo, opus certe nobis fuit Commentariis, quæ Anatomicam diſciplinam Chirurgicæ medendi rationi maxime neceſſariam, integram conſervarent.* That *Ariſtotle* did diſſect the bodies of men is manifeſt out of his *Hiſt. Anim. l.* 3. where he informs us how *he* made an inquiry into the *nature* and *ſeries* of the *veins* in *humane bodies*: and as to *his* anatomizing of other creatures, *beaſts, birds, fiſhes, inſects,* (and how he had ſome *thouſands* employed under him *to that purpoſe*) no man can doubt who reads *Riolanus* and *Pliny l.* 8. *c.* 18. How accurate he was (however his brevity doth not repreſent every circumſtance, nor fully deſcribe things) we

Hieron. Mercurialis Var. Lect. l. 1. c. 10.

Theſe Anatomical *operations of the* Youth *were called* ἐγχειρήσεις ἀναλομικὸς, *which* Hofman *thinks may be rendred fitly in* Latine, Exercitia Anatomica. *Adding*, Didiceram enim ex ejus operis (apud *Galenum*) l. 2. initio has ἐγχειρήσεις ab ipſo artis incunabulo fuiſſe *puerorum in familia Aſclepiadea*, altorum ad factitandam *medicinam*. Sciebam etiam aliunde, longe alium fuiſſe tum *Anatomiæ* rationem, quam nunc eſt, ſeorſim inquam fuiſſe traditam hiſtoriam partium ipſarum, *ſemperq. fultam oculari inſpectione*. Vide *Hofman* Var. Lect. l. 2. c. 13. *The ſame is avowed by* Veſalius *in his Preface to* Charles V.

Lacunæ Epit. *Galenide* anatom. admin. l. 2.

Vide *Riolan.* Anthr. pegraph. l. 1. c. 4.

I would not be underſtood to juſtifie every paſſage *in* Ariſtotle *relating to* Anatomy: *he hath many groſs errours* opere in longo: *but have not alſo* Harvey, Highmore, Silvius, *and others, ſo many as may excuſe his* incogitancy *ſometimes?*

we may judge by this that there are few of the *new inventions*, but are aſcribed unto him; and Dr. *Harvey* is known commonly to have ſaid, *Nihil fere unquam in ipſis Naturæ penetralibus inveniſſe ſe, quin cum Ariſtotelem ſuum penſiculatius evolveret idem ab illo, aut explicatum, aut ſaltem cognitum reperiret.* After *Diocles*, I find theſe other reckoned as notable *Anatomiſts* by *Volcherus*, *Coiter*, viz. *Polybius*, *Eraſiſtratus*, *Calliſtus*, all Scholars of *Ariſtotle*: And after them *Marinus*, and *Lycus*, the Maſter of *Galen*, and *Satyrus*, and *Pelops*, and *Numeſianus*, beſides ſeveral others at *Alexandria* all which *Galen* went to converſe with. But I muſt not paſs by *Herophilus* without an eſpecial *Character*, who did not only correct the *miſtakes* in *Anatomy* which his Maſter *Praxagoras* fell into, but by his *induſtry* and *skill* acquired a repute ſo great, that his name is equal to the moſt famous that ever were *before*, or *ſince* his time: This great man is preferred by *Veſalius* before *Galen*: And it was an uſual ſaying of *Fallopius*, that any man might as eaſily contradict the *Goſpel*, as contradict *Herophilus* in Anatomy. *Contradicere Herophilo in Anatomicis eſt contradicere Evangelio.* This *man* is that *inquiſitive Phyſician*, of whom Mr. *Glanvill* ſpeaks, and who is blamed by *Tertullian* not for *diſſecting humane bodies*, but for diſſecting them *alive*, which he terms *Butchery*. Becauſe, I think Mr. *Glanvill* never read him, and becauſe I will make it *evident* that *one of the Ancients* did diſſect more *bodies of men*, then all the *Society* put together, and that with an *extraordinary caution*. I ſhall ſet down the words of *Tertullian*, and they are theſe,—— *Herophilus ille Medicus aut Lanius, qui ſexcentos exſecuit ut naturam ſcrutaretur, qui hominem odiit ut noſſet, neſcio an omnia ejus interna liquido explorarit; ipſa morte mutante quæ vixerant, & morte non ſimplici, ſed ipſa inter artificia exectionis errante.* Upon which paſſage, *Philip le prieur* notes thus, *Anatomia quæ & celebris magnoque in precio fuit apud Ethnicos, a veteribus Chriſtianis odio quam maximo afficiebatur. Quamvis hic dictum Lanium Herophilum conſtet, quod vivos homines diſſecaret. Id autem facere ſolitos Eraſiſtratum, Dioclem, & Herophilum docet Claudius Galennus* 8. de plac. & 2. *anatom. adminiſtr.* Agreeable to

Dr. *Pearſon* in Dedic. *Laertii* ad *Carol. II.*

Vol. Coiter intro. in anat. c. 6 Galen *in his Coment upon* Hippocrates de nat. hum. *reckons up above 10 eminent Anatomiſts of the ancients.* Vide *Riolan.* Anthropogr.

Mœtius fundam. med. c. 1. p. 10. & *Viſſus* de philoſ. c. 11. ſect. 2.

Tertullian. de anima c. 10. *Gagnæus*, *Mercurialis*, & *Voſſius* read it *ſe, tingentes exſecuit.*

Celsus l. 1. in præcœmio.

of *Tertullian*, is that passage of *Cornelius Celsus* in his Preface. *Necessarium ergo esse incidere corpora mortuorum, eorumq; viscera atque intestina scrutari, longeque optime feciſſe Herophilum & Erasistratum, qui nocentes homines a regibus ex carcere acceptos, vivos inciderint, conſiderarintque etiam Spiritu remanente, ea quæ Natura clauſiſſet, eorumque posituram, colorem, figuram, magnitudinem, ordinem, duriciem, molliciem, lævorem, contactum: proceſſus deinde ſingulorum & receſſus, & ſive quid inſeritur alteri, ſive quid partem alterius in ſe recipit.* This *Herophilus* was undoubtedly a perſon of *vaſt parts, great learning* and *curioſity*. He brought the *Hippocratical* Phyſick to its *heighth* and perfection, compleating the *Anatomical* part, and illuſtrating the Doctrine of the *Pulſes*. His followers had a *School* not far from *Laodicea*, as *Strabo* ſaith, wherein it is not to be doubted but that *Anatomy* was taught, and ſo in that other School of *Eraſiſtratus* at *Smyrna*.

Strabo Geograph. in fine lib 12. citante *Mercuriali* Var. Lect. l. 2. c. 12.

Μεταξὺ δὲ τῆς Λαοδικείας καὶ Καρούρων ἱερόν ἐστι μητρὸς Κάρης λαλούμενον, Τιμώμενον ἀξιολύγως. Συνέστηκε δὲ καθ' ἡμᾶς διδασκαλεῖον Ἡροφιλείων ἰατρῶν μέγα ὑπὸ Σεύξιδος, καὶ μετὰ ταῦτα Ἀλεξάνδρου τοῦ φιλαλήθους καθάπερ ἐπὶ τῶν πατέρων τῶν ἡμετέρων ἐν Σμύρνῃ τοῦ τῶν Ἐρασιστρατείων ὑπὸ Ἰκεσίου From whence it is clear, that in the Reign of *Auguſtus Cæſar* (when *Strabo* lived) *Anatomy* in the *Eaſt* was in great requeſt, and that the *Phyſicians* and followers of *Herophilus* had a great *Academy* betwixt *Laodicea* and *Garura*. And that before thoſe times at *Smyrna*, *Eraſiſtratus* that was a great *Diſſector* of men (even *alive*) had another *Academy* of his followers: whoſe works though they are loſt, yet *Veſalius* ſaith, that one may conjecture out of the paſſages in *Galen* that relate to them, that they were very *accurate* Anatomiſts. —— *Veteribus diſſectionum proceribus, quos ex Galeni libris in corporum anatome ſedulo verſatus eſſe nobis perſuaſum eſt.*---- Not much unlike this character of *Veſalius* is that Elogy which *Veſalius* beſtows upon the Ancients in an Epiſtle of his to *C. Hofman*, enquiring whether the *venæ lacteæ* of *Aſellius* were a part of the *porta vena* known ſo long ago? *Sic habeas, incertum mihi eſſe quid primi illi qui ante Dioclis Caryſtii ævum privatis diſſectionibus in corporis humani partes inquirebant hic viderint,*

Veſalius de rat. Chirur. p. 168.

cum

cum nihil eorum quæ cognorant ſcriptis divulgarint. Vixere fortes ante Agamemnona multi, *ait* Lyricus: *& proculdubio ante* Herophilum *eximii, & in hoc diſſectionum ſtudio exercitatiſſimi, quos ob monumentorum defectum longa nocte oblivio premit.* Veſlingius Ep.20. edit. per *Bartholin.*

I ſhall conclude this diſcourſe of *Herophilus,* with an obſervation about the time when he lived; which was not in the days of *Tertullian,* though Mr. *Glanvill* repreſents them as *Contemporaries*: but many Centuries before, in the time of *Ptolemæus Philadelphus,* and he is famed for his raillery upon *Diodorus Cronus,* who denied there was any *motion,* yet had his *ſhoulder diſlocated.* See *Conring.* de medic. Hermet. c.9 p.83. Some make him more ancient, but none ever brought him ſo low as our *Virtuoſo.* Vide *Voſſ.* de Philoſ. c.11, *Jonſium* de Script. Philoſ. l.1.c.15.

As to the *Romans,* and their skill in *Anatomy,* I cannot ſay much of it, except it be to their *diſparagement.* They were a *military* ſort of people, *rough-hewen,* and thought *all that* below their *ſtudies* or *ſerious thoughts,* which our *Experimental Philoſophers* boaſt of, and recommend unto our care with ſo much *vanity.* All the *Mechanick,* I had almoſt ſaid the *Liberal Sciences,* they thought to be *excellent* qualifications in their *ſlaves,* not in *themſelves*: And they who gave *Laws* to all the world, ſcorned to be inſtructed by their *vaſſals,* and a *conquered* Nation. Upon this account, not onely in the time of *Tully,* but afterwards to the days of *Quintilian* and *Tacitus,* (I know not which writ the Book *De Oratoribus*) it is evident, that however many Gentlemen did inform themſelves of the ſeveral parts of *ingenious Learning,* yet did that *haughty people* behold thoſe perſons with *indignation,* and ſome thoughts of *hatred,* in ſo much as that thoſe who were beſt *verſed in it,* pretended ignorance and ſcorn of it. Things being in this condition, and the *Romans* having no other *Phyſicians* then their *Slaves,* it is not to be wondered if they were not eminent for *Anatomy. Cato* had baniſhed the *Phyſicians* long ago, and after-ages gave *them* little encouragement.

I do not at present remember any *Physician*, whose name hath any thing of the *Roman* till *Cornelius Celsus*, and after him *Vectius Valens*. *Pliny* saith, that even to his time, in the reign of *Titus Vespasian*, the *Romans* did not care to profess and practise *Physick*. *Solam hanc artium Græcorum nondum exercet Romana gravitas in tanto fructu: paucissimi Quiritum attigere, & ipsi statim ad Græcos transfugæ: imo vero autoritas aliter quam Græce eam tractantibus, etiam apud imperitos expertesque linguæ, non est.* Nat. hist. l.29.c.1. In the time of *Augustus Cæsar*, his freed man *Artorius Musa*, and his brother *Euphorbus* gave some credit to *Physick*, and afterwards several eminent *Greeks* are said to have flourished; but whether it were that the *Romans* were *impatient* to learn so much as was requisite (or thought to be so) to make a man eminent in the *Hippocratical* and *Herophilian* way; or whether they thought *it* more becoming their *grandeur*, rather to learn (with all the world) a *new Method of Physick*, then seem to have been *so long* as it were *brutish* and *ignorant* in comparison of the *Greeks*; or whether that the *new principles* and *method* were more agreeable to that *Empirical* way, they had been accustomed unto (See Plin.nat. hist.l.26.c.3.) and so more easily received by the *populace* then that of *Hippocrates* made up of a *Grecian* dyet, and *medicaments*; whatever was the reason, I finde that the Romans did generally incline to that Sect of *Physicians*, called the *Methodici*, begun by *Asclepiades* and *Themison* in the time of the *Triumvirate*, or *Vectius Valens*, and compleated by *Thessalus* in the time of *Nero*: This *Sect* seems to have had the advantage over all other the *Physicians* amongst the *Romans* from the time of *Augustus*, to the reign of *Severus*, which is near three hundred years. *Pliny* calls *Themison*, *Summum authorem*, and by that place in *Juvenal* one would guess him to have been a man of *great notice* and *general practice* in the days he lived.

Ideo deserta est hæc disciplina, quia necesse erat in ea literas scire. *Pliny.*

During the flourishing of the Roman Empire, *the study of* Physick *was principally pursued at* Alexandria *in* Egypt. *There* Herophilus *and his Scholars had given it credit, and the* Empiricks *and* Methodists *had their* Academies, *and the* Jatrosophistæ *were endowed* professors *The repute of* Alexandria *being such even in the days of* Valentinian, *that it was credit enough for any* Physician *to say he had been* bred there. Ammian. *Marcell.lib.22.*

Plin.l.14.c.17.

Mor-

Morborum omne genus, quorum ſi nomine quæras,
Promptius expediam quot amaverit Hippia mœchos,
Quot Themiſon *agros autumno occiderit uno.*

Theſſalus, againſt whom *Galen* and *Pliny* inveigh, was certainly a man, not only of *great Eloquence*, but alſo of *extraordinary Learning* and *Judgement*, as we may gueſs by thoſe parcels and fragments of that excellent man, which are all that remains of him, and they preſerved in the works of others. His Books *de Communitatibus & Syncriticis* are peeces whoſe loſſes I much lament. The Memory of his *Tombe* is not loſt upon which he inſcribed himſelf, ἰατρονίκη, or, *The Conquerour of Phyſicians*. His Letter to *Nero* had ſomething of a *gallant confidence* in it, which may become *Heroes*, and is juſtified in men of *great Learning*. *Cum novam ſectam condiderim, & quæ ſola vera ſit, propterea quod qui ante me fuerunt omnes nihil utile prodiderunt, vel ad ſanitatem tuendam, vel ad morbos propulſandos*---. The generality of his followers ſeem to have been excellent *Phyſicians*, as *Dionyſius*, *Proculus*, *Archigenes*, *Soranus*, *Attalus*, *Julianus*, and others. I ſhall not inſiſt upon a particular relation of *their tenets*, which one may ſee excellently illuſtrated by *Proſper Alpinus*. This ſect of *Phyſicians* ſeems to have left impreſſions of its *method* and *principles*, in all places where the *Roman Empire* ſwayed. They placed little value upon *the exact knowledge* of *Anatomy*, being content with a *general skill* therein, and enquiring no further than was *neceſſary*. They knew that the *Romans* had formerly baniſhed the *Phyſicians* (as *Archagathus*) from amongſt them, for uſing their *Patients* with much *cruelty*, *cutting* and *burning* them; and underſtood the humour of the *people* ſo well, how they diſliked the diſſections of *humane bodies*,

Proſp Alpin. de medic. methodica.

Quintilian *being to deſcribe* Phyſick, *renders an account of it agreeable to the* Methodiſts. In declam. 8. Gemini Languentes.

They called Gallen, *when he put himſelf forth in the world by the oſtentation of* Anatomy *and* Philoſophy, *Logiater*: Logiatri autem nomen ſui temporis medici Romæ Galeno per contemptum imponebant; ut ita eum traducerent, quaſi non reipſa, nec uſu, & exercitio artis peritus eſſet: Sed ad loquacitatem duntaxat & diſſerendum de iis quæ ad artem pertinent comparatus. *Geſner.* in Scholiis ad *Caſſium* p. 57.

bodies, especially *alive*, and therefore they closed with that *popular prejudice*, and turned it to their advantage; neither *dissecting of bodies*, nor tormenting them with those *odious* or *cruel methods of Cure*, which were practised by the followers of *Herophilus*. Nor do I doubt that those objections in *Celsus* against *Anatomy*, were put into his mouth by the *Methodists*, as well as *Empirics*, *viz.* that all *Anatomy* of bodies was a *nasty performance*; but to dissect the *living*, most *barbarous* and *cruel*: that as much of *Anatomy* as would instruct one sufficiently, might be learned in a *Camp*, where the *Physician* need not make wounds, but *learn* at once and *practice Cures*. Hence it was that the study of *Anatomy* was so much out of request at *Rome* in *Galens* time, that I think he mentions not *one* curious *Anatomist there*, though he tell how *Satyrus* taught *him* at *Pergamus*, and *Pelops* at *Smyrna*, and *Numesianus* at *Corinth*, and others. There were some that were excellent *Ostrologists* at *Alexandria*. And I am apt to think, that even *he* durst not for fear of publick *odium*, dissect any *living* men there, because, as *Celsus* saith, *most people held it to be cruelty*, and perhaps would not have *thought well of him*, who should have dissected any *dead men*. Whereupon he set up with *Apes*, dissecting *them*, as being nearest to *men* in resemblance, and imagining the *fabrick of their bodies* to have as great an *affinity* with the parts of *men*, as their *shapes* had; that this was the cause of many mistakes in him, is certain; and demonstrated by *Vesalius*. But that he never made any *Anatomies* of *humane bodies*, or considered any as they came in *his way*, is a *calumny* which might be refuted by sundry instances out of his Works, and some thereof are to be seen in *Riolanus* Anthopogr. l. 1. c. 12.

Vesalius *in his Treatise* de rad. Chinæ *sheweth how Galen dissected* Apes, *and was thereby led into sundry mistakes. But even such as did blame* Galen *were themselves faulty, as* Vesalius *and* Columbus; *which appears by what they say about the* kidneys; *which they describe out of* brutes, *not* men, *as* Piccolominеus *and* Beverovicus *observe* Beverovic. de calculo, p. 3. *Read also* Fallopius *Observations*

Vesalius in dedic. lib. de fabric. corp. hum. ad Carol V. Imper. *In the same place he calls* Galen, dissectionis professorum facile primarium.

Vesalius never raised his imputations to this heighth; all that he saith of *his nature*, is, *Nobis modo ex renata dissectionis arte, diligentique Galeni librorum prælectione, & in pleriſque locis eorundem non pœnitenda restitutione constat, nunquam*

quam ipsum nuper mortuum *corpus humanum resecuisse. At vero suis deceptum Similis* (licet ipsi arida, ac veluti ad ossium inspectionem parata hominum cadavera occurrerint) *crebro veteres Medicos, qui hominum consectionibus se exercuerant, immerito arguere.* Nay, it is evident out of *Galen*, that the *Roman* Physicians which were in the Army of *Antoninus* did dissect the *Germans* that were killed by him in battel. As for that *Learned man of our own*, out of whom he tells us, *That the Romans held it unlawful to look on the Entrails*: I know not who it should be. Mr. *Boyle* indeed doth say, that in *Galens time it was thought little less then irreligious, if not barbarous, to mangle the bodies of men*: which how far it is true, one may guess out of what I have said; But that *Honourable Person* speaks in such a manner as gives us *little of exception*; Mr. *Glanvill* is so peremptory, that I wonder that he did not deny, that the *Romans* did not use any *Augury* from the *inspection* of the *bowels, heart*, and *liver* of beasts; *or* that they did not eat the *Livers* of *Geese*, and other *Guts* of several *Animals*. This is so well known to every *School-boy* that hath read *Martial*, or *Horace*, or *Virgil*, that I need not speak of it. Had the *Romans* held it so unlawful a thing to behold the *Entrails* of *Animals*, I wonder they gave the name of *Visceratio* to those distributions of flesh which they publikely used: to such *unlawful* customs, *Virgil* would not have alluded, when he brings in *Dido* her self,

Galen.l.3. sec. gen.c.2.

——*Pecudumque reclusis*
Pectoribus inhians spirantia consulit exta. Æneid.l. 4. v.64. & Georgic.l.1.v.484.
Tristibus aut Extis fibræ apparere minaces.

Nay, they carried the bodies of beasts open with their *Entrails displayed* to be sold publickly, as *Mart.* shews *l. 6. ep. 64.*

Nevvaleam, si non multo sapit altius istud,
Quod cum panticibus laxis, *& cum pede grandi*
Et rubro palmone *vetus, nasisque timendum,*
Omnia *crudelis Lanius, per* compita portat.

But perhaps *he* will confine his discourse to the *Entrails* of men, why then did not he speak more plainly? And even in this case, that some *superstitious* persons might hold it *impious* and *unlawful* is possible:

and

and that others out of enmity to the *Anatomical Physicians*, (as *Pliny l.* 28. *c.* 1.) *Aspici humana exta nefas habetur*, might call it so, I deny not. But what Law was there against it? How comes it to pass, that *Celsus* in his debate about the *lawfulness of Anatomizing* even *living bodies*, saith (or maketh others to say) that it is only *cruel*, or *nasty* and *abominable*; not *impiety* or a *breach of Religion*? Besides, *how* could any *Physician* in those days have dressed such wounds in which their *Entrails* either *gushed out*, or were hurt, in case it had been *unlawful to look upon them*? It is manifest that *Celsus* saith, a prudent *Physician* may from *such accidents* learn *Anatomy*; *Ita sedem, positum, ordinem, & figuram, similiaque alia cognoscere prudentem medicum*, and adviseth him to improve the occasion: And he was a Person learned not only in the *Physick*, but *Civil* Laws of his *Countrey*.

I believe that place in Pliny relates only to Augury, that it was not lawful amongst men to make use of humane bodies, and search their bowels to those ends: this was nefas: but nothing else.

To convince our *Virtuoso* a little more, out of *Schoolbooks*, in which *he* ought to be conversant. Is there not a controversie agitated in *Seneca*, Controvers. l. x. contr. 6. about *Parrhasius* the Painter? how he brought an old *Olynthian*, and dissected him *alive*, thereby to draw the picture of *Prometheus* with a *vulture* preying upon his *Liver*! Is it not agitated *pro* and *Con*, by *Romans* and *Grecians*? Is there any one that saith it was *unlawful* for him to *behold the Entrails*? *Nay*, is it not said in the midst of *Rome*, that it was always LAWFUL? *In argumentis dixit, quantum semper Artibus LICUISSET, Medicos ut vim ignoratam morbi cognoscerent, viscera rescidisse HODIE cadaverum artus rescindi, ut nervorum articulorumque positio cognosci possit.* In *Quintilian* is there not a *Declamation* Declam. 8. (*Gemini languentes*) in which the *Mother* accuseth the *Father* for permitting the *Physician* to dissect one of the sick *twins*, thereby to discover the disease of the *other*! Doth not the *Mother* there *bid him* dissect the bowels of the *dead youth*? *Differ saltem, pater, hanc calamitatem: quicquid ex filio facis, facies ex cadavere. Si deprehendi potest languor dum occidit, facilius cum occiderit.* Doth *she* not describe the cruelty of that *Anatomy* very tragically? *Passus est miser discurrentem per omnia reserati pectoris improbum vagæ artis errorem.*

rem. Contentum fuisse medicum toto homine discurrentem primo putatis aspectu? Egesta sæpe vitalia, pertractata, diducta sunt: fecerunt manus plura, quam ferrum. Stat juxta medicum pater apertis visceribus inhians, stillantem animæ sedem cruentis manibus agitantem: ne festinet, hortatur; jubet alius diligentiusque scrutari: Interrogat, dubitat, contendit, affirmat, & accepit de filii morte rationem —— Inter hæc reficiebatur miser haustibus, detinebatur alloquiis, comprimebatur residuus cruor, claudebantur aperta vitalia. Nemo unquam tam nova pertulit commenta fevitiæ, tanquam sanaretur occisus est--- Vos tunc putatis illius tantum languoris medicum quæsiisse causas? quæsivit quicquid nesciebat, & usus occasione rarissima in omnem voluit proficere novitatem. After this *she* tells in what manner *she* gathered up his *bowels*, and by closing up his Corps fitted him for the Funeral. *Corpus quod medicus, quod reliquerat pater, hoc sinu misera collegi, ac vacuum pectus frigidis abjectisque visceribus rursus implevi, sparsos artus amplexibus junxi, membra diducta composui.* If any one can imagine, that this great *Orator* in so solemn a Declamation would have omitted so important an objection as the *unlawfulness* and *impiety* of beholding the *entrails* of the *youth*, certainly he thinks too meanly of the judgment of *Quintilian*, and too well of his *own*. It appears out of that *Oration*, that they had seldom opportunities of dissecting *men alive*, and therefore he calls it *rarissimam occasionem*. And that they were not ignorant of *Anatomy* and the *inward fabrick of humane bodies*, it is evident further out of that *Oration*, where the Mother says the *Physicians* must needs already have learned that part of their Art.

Sufficit quod aliquando jam facta ex unius hominis inspectione, ad totius intellectum naturæ medicina profecit. Quid allaturus hic ægroto es, quod non tot seculorum, tot languentium experimenta deprehenderint?

How could they behold the Ludi Circenses, *the Gladiators fighting in the* Theatre, *and at the* tombs *of the deceased; or those* sad spectacles *described by* Martial? *I profess I think it as* gross a mistake *to say they held it* unlawful to behold the entrails of men, *as to deny the* Augury by beasts.

As for what Mr. *Glanvill* saith about *Democritus*, that *he was fain to excuse himself to Hippocrates for dissecting of beasts*; this is as true as all the rest. Never was there a fitter *second*

for Mr. *Sprat*, then Mr. *Glanvill*. They do not *cite*, but *invent* stories, and that with so much confidence, that a man must be assured by *his own reading*, before he can suspect *theirs*. That *Hippocrates* was a diligent *Anatomist*, is a thing every one must confess who either knows the manner of *their education* then, or hath looked into his *Anatomical* books *de locis in homine*, *de fracturis*, and sundry other pieces of his. That *he* not only contemplated the *seat* and *action* of parts in the *dead*, but *living*, appears by this passage, *De Articulis sect* 43. where he speaks about the setting of the *Sphondyles of the back*; *Itaque si tale contingat, palam est quod neque concutiendo, neque alio quodam modo reponi possit, nisi qui dissecto homine & manu in ventrem injecta, inquisitionem faciat, ut ex interna parte ad externam manu retrudat: atque hæc in mortuo quidem facere possent, in vivo autem non ita.* But I shall give an account of the *Anatomy* of *Hippocrates*, in the words of the learned *Riolanus* Anthropograph. l. 1. c. 2. *Testatur* Galenus Comment. in lib. 3. de artic. *Hippocratem potissimum rationi corporum incidendorum sedulam operam dedisse, cum Anatomen mirum in modum ad artem medicam conferre sciret, quod nunc aperte docet cum spinæ naturam intelligi voluit, quam Empirici non secus atque cæterarum partium contemplationem inutilem esse dicunt. Ipsemet Hippocrates lib. 3. de artic. Commentarios de venis & arteriis pollicetur, quos nunquam videre potuit Galenus. Præterea* librum de dissectione *conscripsit*, quem imperfectum habemus. *Ipsemet Galenus* libros de *Anatome*, secundum *Hippocratis* doctrinam *composuerat, quorum deploranda est jactura. Hippocrates canes dissecuit ut pulmones observaret.* lib. de corde. *Ibidem monèt quod dissectio accurata hujus partis non est opus cujusvis, sed periti artificis, & appellat istud opus Chirurgian. l. 6. Epidem, scribit hominem habere cola intestina cani similia. Idem lib. de intern. affect. testatur se in bove, in cane, & sue, quod impedibus dissectis tubercula in pulmone aqua referta inveniisse, unde natus fuerat hydrops thoracis. Idem testatur se ex hominis ossibus ossa descripsisse: primus spinæ admirabilem figuram descripsit: primus vesiculas seminarias,* earumque *situm, omenti usum, valvulas venarum, ortum nervorum, lienis actionem,*

Pag. 800. tom. 2. edit. *Vander Linden.*

actionem, uteri conformationem. Atque ut extaret aliquod monumentum æternum & immutabile suæ diligentiæ, laborisque in hoc studio exantlati, sceletum ære fabricatum Apollini Delphico consecravit: ut Author est Pausanias lib.10. And is it credible that ever *Democritus* should be forced to excuse himself to *Hippocrates* for cutting up of *Animals*, as if it were so *uncouth* and *strange* to *him*? I cannot answer for the Intellectuals of our *Virtuoso*, but no man of an *higher capacity* can believe it. The pleasantest part of *this Narrative* is, that there appears no such thing *upon record*. First of all the story of *Democritus*, how *Hippocrates* came and found him busie in *dissecting of Animals*, is called in question by *Cortesius* in *Miscellaneis*, as *Riolanus* tells me. And indeed I cannot perswade my self that those *Letters* in the end of *Hippocrates* works are *genuine*. But to pass by this exception. All that *Hippocrates* writes in his second Letter to *Damagetus* amounts to this. That at the request of the people of *Abdera*, he came to cure *Democritus* of his supposed *madness*, that being conducted to his house, he found him sitting under a *Plantanus* tree in a garb not much differing from a *madman*, and postures that had something of the same *humor*: *Ipse Democritus sub ampla & humillima plantano sedebat, in veste crassa citra humeros desinente, solus, discalceatus, super lapidea sede, valde pallidus ac macilentus, promissa barba —— Ipse vero cum inculto ornatu, super genibus, librum habebat, sed & alii quidam ex utraque parte adjacebant. Accumulata etiam erant Animalia multa per totum resecta. Et ipse quidem aliquando concitate incumbens scribebat, aliquando quiescebat, diu multumque se continens, & in seipso meditans. Deinde non longe post, his peractis, exurgens deambulabat, & viscera animalium inspiciebat, & depositis ipsis digressus, rursus desidebat.*--- When *Hippocrates* approched near him, he was busie *writing*, and even then his deportment had something odde and *Enthusiastical* in it. Τὰ μὲν ἐμειδία, τὰ δὲ ἐξεγέλα —— ὅτι δήποτε γράφων ἐνθουσιωδῶς, καὶ μεθ' ὁρμῆς. After the first *complements* (which are great and *not usual* in those days) *Hippocrates* demanded of him *what he was writing*? He replied about *madness*: *and what*

about that, said the great *Physician*? To which he answers again thus. Τί γὰρ εἶπεν, ἄλλο πλὴν εἴτις τὲ εἴη, ὅκας ανθρώποις ἐγγίνεται, καὶ τίνα τρόπον ἀπολοφέοιτο. Τάτε γὰρ ζώα ταῦτα, ὁκόσα, ἔφη, ὁρῆς, τούτου μέντοι γε ἀνατέμνω εἵνεκα, οὐ μισέων Θεοῦ ἔργα, χολῆς δὲ διζήμενος φύσιν καὶ θέσιν. *Quid enim, inquit, aliud quam quid sit, & quomodo in hominibus generetur, & quomodo allevetur. Nam animalia hæc, quæ vides, inquit, hujus gratia reseco, non quod odio habeam opera Dei, sed bilis naturam ac sedem quærens.* How much this and the whole passage of that *Enterview* makes for Mr. *Glanvill*'s purpose, I see not. *Hippocrates* doth not blame *him* for *anatomizing of animals*, nor is surprized at the *novelty*, nor troubled at the *impiety* of the action. *Democritus* knowing what apprehension the people had of him, and fearing lest the *garb* and *posture* he was in might confirm to *Hippocrates*, the truth of the *report* tells him how he employed his thoughts, and that the *Animals* that lay there upon the ground, were not slaughtered by *him* in a *frantick rage*, out of *hatred* to the *creatures of God*; but cut up *Anatomically* by him, thereby to discover the *seat* and *nature of the gall*, and the effects it had upon *Maniacks*. Whereupon *Hippocrates* was wonderfully pleased with the testimony he gave of the *soundness of his judgment*, and after some other *prudential discourses*, departed, satisfied about the good condition of his *Patient*. But if *Democritus* were not *out of his Wits*, I believe Mr. *Glanvill was* to alledge such an *impertinent* story. But *idle persons*, that would upon *easie termes* acquire the repute of *Learning*, by *citing quotations*, are often thus imposed upon, and liable to mistakes. And perhaps there may be some person in the world that I know not of, who may have abused our *Virtuoso* in *this case*: but *He* should have minded the *Text* better.

What Pope *Boniface* the Eighth did, I know not. But I am apt to suspect a person that hath told me *so many untruths*. The place in the *Canon-Law*, which I am apt to beleeve Mr. *Glanvill* never saw: It is *lib.* 3. *Extravag. titulo de sepultura*. And *Riolanus*, whom I had rather credit, gives this account of it; *Inter Christianos Papa Bonifacius octavus barbarum*

Anthropogr. l. 1. c. 12.

barum & inhumanum judicavit, peregre mortuorum corpora exenterare, carnibusque ſpoliare, ut oſſa lecta & terſa in locum ſepulturæ, quem vivi delegerant, commode perferri poſſent. It ſeems that *Pope* thought it an *inhumane* and *barbarous* thing not to diſſect bodies for *information* ſake; but to *embowel them*, and reduce them into *Sceletons*, and ſo to carry their bones to diſtant places to be buried according to the deſire of the *deceaſed*. I am apt to think this *Canon* was never applied to *Anatomy*, and perhaps there is nothing of *Excommunication* in it, ſince *Riolanus* doth not mention it.

As for the groſs errours in *Anatomy* which *Galen* is charged with, I know not one that incommodates a man *in point of Practice*, but that the *Method* he took (however founded on falſe *principles*) was *ſecure* and *good*. Upon which it happened that *all his followers implicitly* ſubmitted to his *Anatomical* relations without further *Enquiry*, and taught *his Errours* for *truths*: And perhaps a certain vanity ſeiſed *Galen* to contradict the famous *Herophilus* out of *diſſected Apes*, thereby to raiſe his own credit. However it was, from *him* aroſe moſt of the miſtakes in *Anatomy*, that were tranſlated to the *Moors*, and from them to our *Anceſtors*. The *Moors* are ſaid by *their Religion*, to forbid the medling with *dead bodies*: Which Aſſertion, how true it is, I know not, becauſe that *Avicenne* and *Albucaſis* commend the ſtudy of *Anatomy*, as neceſſary in a peculiar manner to *Chirurgeons*. They practiſed ſundry *Chirurgical operations* in *Cauteries*, and opening *Arteries*, which ſeemed to require an *Experimental* skill in *diſſections*; and which were *their own inventions*. In fine, *Averroes* pleads not any ſcruples of *Religion* for his *ignorance* in *Anatomy*, but laments the *Civil Wars* of the *Moors*, which hindred him from inquiring by *diſſection* into thoſe controverſies betwixt *Galen* and *Ariſtotle*, which he had occaſion to debate. Yet did *Averroes* at all adventures, aſſert the credit of *Ariſtotle* againſt *Galen*, out of an emulation againſt *Avicenne* who was a *Galeniſt*. From theſe two great men amongſt the *Moors*, as the knowledge of *Phyſick* and *Philoſophy*, happened to be imparted to the *barbarous Chriſtians* of the *Weſt*, ſo was there a feud propagated betwixt the *Philoſophers*,

Hinc [*Galeno*] univerſi fidem dedere, ut nullus repertus ſit medicus, qui in *Galeni* Anatomicis voluminibus vel leviſſimum quidem lapſum deprehenſum eſſe, multoque minus deprehendi poſſe cenſuerint. *Veſalius* in dedic. lib. de Fabric hum.

ſophers and the *Phyſicians*; and the *controverſies* were the more *intricate*, becauſe the *Sciences* had not been ſo well tranſlated out of *Greek* into *Arabick*, as was requiſite; and they were *worſe* put into *Latine*. After the taking of *Conſtantinople* by the *Turks*, when ſome learned men had fled thence into *Italy*, they began to impart unto the world new books, to acquaint the *Weſt* with the *Greek* tongue, and with the *Greek* Works of *Hippocrates*, *Ariſtotle*, and *Galen*; and thereby multiplied many Controverſies in the *practice* of *Phyſick*, about *Phlebotomy*, and *Purging*, and the like; eſpecially about *bleeding* in a *Pluriſy*, *on which ſide it ſhould be done*. The *contention* was *fierce*, and ſome proofs being fetcht out of *Anatomy*, ſome perſons were excited to enquire into *humane bodies* diſſection, thereby to determine this *controverſy*, and alſo the others betwixt *Ariſtotle*, *Galen*, and others. Amongſt theſe *Veſalius* was (I had almoſt ſaid) the firſt and *principal*, and by his indefatigable pains prevented much the induſtry of *others*. After him *Fallopius* and *Euſtachius* were the moſt remarkable; though many others came in with their *little inventions* to make up the *cry*, and failed not to ſupply the inutility of their diſcoveries with *exceſſive clamor*. What Apologies were made for *Galen* by *Sylvius*, and others, would be tedious to relate; they being ſo *ridiculous*, and repugnant to common ſenſe, that nothing could ſtop the growing glory of *Veſalius* and his *followers*. The iſſue of all was, that as *Hippocrates* loſt no credit by an ingenious confeſſion of his *miſtake* about the *Sutures* in the head of *Autonomus*; ſmall errors being not obſervable in *great Authors*: So *Galen* ſtill retained a great repute in the world, his other Works having advanced him above the effects of *petty* calumnies, or defaults. And the great *Guinterus Andernacus*, a competent Judge of old and new diſcoveries in *Phyſick* and *Anatomy*, gives this cenſure upon thoſe curious Diſquiſitions: *Multa in rerum natura extant, quorum notitia non quidem Medicum aptiorem facit, ſed medicinæ tantum profectum reddit.*

Yet neither are all the exceptions made by Veſalius *againſt* Galen *allowable.* Galenum aliquando in verbis potius quam in ſententiis carpit, aliquando mutilum (quod facere debuerat) minime excuſat, ac ſæpe indignius, quam Anatomicum, Philoſophum, ac Medicum tam inſignem deceret, carpit ac accuſat. *Fallopius* obſervat. anatom. p. 3.

De vet. & nova med. comment. 8. dial. 5 p. 261.

dit, Sic nulli ob accuratam illam, ne dicam curiosam nimis, partium corporis perscrutationem Medici excellentiores, sed ob curationes dextre sentatas absolutasque censentur. Ideo etiam Hippocrates, Galenus, Erasistratus, *& plures id genus alii, tantum ex rerum natura & corporis humani fabricatione scrutari voluerunt, quantum ad medicinam probe exercendam ex usu esse putarunt. Non eadem enim semper omnibus similem ob causam conducunt. Sic Anatome aliter physicis inseruit, qui disciplinas ipsas propter se amant; alterii, qui illam non adeo affectant, sed nihil temere a natura factum esse demonstrant: aliter his qui argumenta* (ut ille ait) *ad actionem quandam vel naturalem vel animalem cognoscendam, ex partium humani corporis historia adferre nituntur: aliter medico qui manum aculeis, telonumque cuspidibus probe exprimendis vel alicui parti apte excidendæ vel sinubus & fistulis & abscessibus incidendis adhibiturus est; quo Anatomes usu nihil æque est necessarium.*

Certainly it had been an action of greater ingenuity in our *Novelists* to have acknowledged the many excellent things that are in *Galen*, which are so advantageous to *Physick*, then to endeavour to render a man *multi ingenii, multaque nihilominus habiturum*, contemptible by the representation of a *few* defects in *him*, relating to things not *much* material to *his profession*. It must always be said of *Galen*, that he was the man who by his *dextrous* wit, happy *practice*, and great *eloquence*, as well as *universal learning*, did restore the glory of the *Hippocratical Physick*, which was in a manner extinct *in his days*. He again brought *Anatomy* into request, which had been slighted and dis-used so long: he himself dissected bodies *privately*, and publickly in the *Temple of Peace*; and amongst other Discoveries of his own, it is observable that he found out the use of *recurrent nerves*, whose influence upon the voice is such, that as they are *pressed* or *cut into two*, so a *Dog* becomes perpetually *mute*, or onely *howls*, never *barks*. Had that curiosity been but the discovery of some *Novelists*, what a noise would *they* have made? what *boastings* should we have had? But all that is good in *Galen* is passed by, and to make way for the glory of our new

Vide *Columbum* Anat. l. 14. & *Vesalium* de fabrica corp. hum. l. 4 c. 5.

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Inventors, *Veſalius, Fallopius, Carcanus, Euſtachius, Ingraſſias, Columbus, Arantius, Varolius,* are not ſo much as mentioned by Mr. *Glanvill*; to the end that *we* may (if we will) believe that it is the *genius of this Age* alone, which puts men upon diſcoveries, and that before *them* there were none that had merited *this remark.*

Plus ultra, pag. 13. Riolanus *aſſerts the firſt invention of the* Valves *in the* veins *to* Hippocrates. *Anthropogr. l.* 5. *c.* 49.

"I inſtance in the moſt *remarkable* of their diſcoveries "briefly: and thoſe I take notice of are, *The valves of the* "*veins,* diſcovered by *Fabricius ab Aqua pendente*: The valve "at the entrance of the *Gut Colon,* found as is generally "thought by *Bauhinus.*—— I cannot think theſe to be ſo remarkable diſcoveries, but that he might have found out many more, ſince the time of *Veſalius,* I ſhall name one wo gave a great light to the *Circulation of bloud,* and that is the diſcovery which *Realdus Columbus* made, that the *blood* did paſs through the *Lungs* out of the *right* ventricle into the *left,* and ſo into the *Aorta,* and all the body. As for the *valves in the veins,* I believe there are *few* that think that *Fabricius ab Aquapendente,* was the firſt diſcoverer of *them*: for they were ſhewed to *Fabricius* by father *Paul,* that famous *Venetian* Monk, as appears in his *life* written by *Fulgentio*, and extant in *Engliſh.* Neither indeed was Father *Paul* the firſt Inventour of them, for they are deſcribed before by *Jacobus Sylvius,* Profeſſor of Phyſick at *Paris,* as *Riolanus,* and *Slegelius,* and *Bartholinns* do inform the world. And as to the *valve* in the beginning of the *Colon*-gut (if there be ſuch a one, and that it be not rather a protuberant *circle,* ariſing from the joyning of the *Ileon* and *Colon,* as *Pavius, Falcoburgius,* and *Riolanus* hold) whatſoever it be, it was diſcovered by *Varolius,* and called the *Operculum Ilei,* before that ever *Bauhinus* was born, as *Riolanus* doth demonſtrate: there are *two others* that may as juſtly pretend to *it,* to better merit the credit then *Bauhinus,* and thoſe are *Solomon Albertus,* whom *Bartholin* inclines unto: and *Joannes Poſthius* of *Montpelier,* whom *Riolanus* alſo favours.

Riolanus Anthropogr. l. 5. c. 49. *Marquard. Slegel.* de circul. ſangu. l. 2. p. 7. *Bartholin.* in libello de venis c. 2. *Varolius* Anat. l. 3. c. 3 *Riolan.* Anthropogr. l. 2. c. 14. *Bartholin.* Anat. reſ. l. 1. c. 11.

"The *Sinus of the veins,* and their uſe found out by Dr. *Wil-* "*lis*—— I wonder Mr. *Glanvill* ſhould not acquaint us with thoſe particular *Sinus* which Dr. *Willis* ſhould finde out; for

Plus ultra, pag. 14.

ſince

ſince in common diſcourſe, when we ſpeak undeterminately of the *Sinus*, we underſtand thoſe of the *brain*, it did become *him* to tell us which others he meant: leſt a man that knew *his skill*, ſhould apprehend him ſo ignorant as to think that Dr. *Willis* had newly found out thoſe *Sinus*, one whereof hath for above *two thouſand years* born the name of *Herophilus*, and was called *Torcular Herophili*, in Greek Ληνός. But I ſhall be ſo *favourable* as to think that theſe are not the *Sinus* he meant, Dr. *Willis* having tried nothing more in proſecution of them, then to purſue the *Circulation of the blood* there by the injecting of *Inkiſh* liquor, whereas *Wepferus* uſed a *tincture of Saffron*; and *Bartholin* evidenced the *ſame thing* by a *pair of bellows*, or *tube* and *winde* inſufflated. I do beleeve that *He*, or *they that ſuggeſted this to him*, did mean the *Sinus* or *venæ vertebrales*, which are deſcribed *exactly* in the Doctors *Book*, in the *thirteenth Table*. But I muſt tell him, that whatſoever there is in that Piece, which is *Anatomical*, the glory thereof belongs to Dr. *Lower*, whoſe *indefatigable induſtry* produced that *elaborate* Treatiſe; and any man that knows the *great practice* of that other *Doctor*, will grant, that although *he* could not want *abilities*, yet he wanted *leiſure* to attend to ſuch *painful* and *tedeous inquiries*. Dr. *Willis* indeed *candidly* doth relinquiſh this *honour* to Dr. *Lower*, and *his pains* deſerved *your commendation* (Mr. *Glanvill*) if that be of any value, ſo much more then *thoſe other inventions* that are celebrated by the *Virtuoſi*, by how much the ſubject was more *minute* and *ſubtile* which he was to *trace*. All that Dr. *Willis* contributed, that I hear, was the *diſcourſes* and *conjectures* upon the *Anatomical deductions* of Dr. *Lower*, which as *ingenuous* as they are, I am ſure neither *are*, nor ever *will paſs* all for *inventions*. But in the caſe I now mention, I am confident that Dr. *Lower* is ſo ingenuous, as to acknowledge that what *He* exhibits there, is taken out of the *Cuts* of *Varolius*, as far as where *they* empty themſelves into the *ſubclavian veins*: but I think that as to the *Synus*, or *veins*, and *arteries* all along the *Spine*, as there is not any *Cut* of *them* extant *before* that I hear of, ſo I allow them to paſs as *his invention*: but the accurateneſs of his *Neurology* equals to the beſt Inventors.

Dr. *Willis* de cerebro c. 6. p. 82, 83.

Jo. Jac. Wepferus Apoplex. p. 116. *Bartholin.* Anat. l. 3. c. 7.

But if Mr. *Glanvill* injur'd Dr. *Lower* in attributing what he invented unto Dr. *Willis*, he will [illegible] *his own* diſcoveries, you ſhall ſee what a *Divine* can do in *Phyſick*. 'St. *St*"! I adde the *origination of the Nerves*, which were of old ſuppoſed to ariſe out of the ſubſtance of the *brain*, but are found by late *Anatomiſts* to proceed from the *medulla oblongata*. This is ſuch an *Addition* as becometh our *Novelliſts*, moſt that they pretend unto being no more then. Mr. *Glanvill* here boaſts of; and which is ſo pitiful an acceſſional in *Anatomy*, that none ever bragged of it, or upbraided the *Ancients* about it, that I remember, except *Bartholin* may be ſaid to do it. As to the late *Anatomiſts*, unto whom he aſcribes this *invention*, I would he had told *their names*. The difference betwixt the *cerebrum*, *cerebellum*, and *medulla oblongata*, is a modern (but not very *late*) diſtinction. Some have made the *medulla oblongata* and the *ſpinal marrow* to be but productions of the *brain* and *cerebellum*, from whence it raiſeth it ſelf by four *foundations* or *roots*: the diſcrepancy betwixt *that* and the *other* parts whence it is *originated*, not being ſuch as to juſtifie any *great* conteſt about it: ſince it is the uſual courſe of *Nature* in its progreſs from the union of *two different bodies*, to produce an *intermediate ſubſtance*, participating of the nature of both. *Spinalis medulla ortus principium rectius cerebro atque cerebello acceptum fertur, unde non immerito caudex, ſive proceſſus, ſive ſoboles cerebri appellatur: nam vix in ullo, niſi in duritie (eſt enim cerebro aliquanto ſolidior & firmior) videtur a cerebro differre.* Some have made the *brain* & *cerebellum* to be productions of the *ſpinal marrow*, which enlargeth it ſelf within the *skull*, and generateth thoſe two *Apophyſes* called the *cerebrum* & *cerebellum*. In fine, it doth not appear that the *Ancients* miſtook much the place of the *origination of nerves*, if you reckon amongſt them *Veſalius* and *Fallopius*: but *they* ſaid they roſe all from the *brain*, underſtanding by that word all that which is included within the *skull*, and termed that to be the *ſpinal marrow*, which was without the *skull*, and whence thoſe other *paria nervorum*

Vol. Coiter. obſerv. anatom miſcel. Ex ſubſtantia *cerebri* & *cerebelli* quatuor radicibus oritur primum truncus inſignis, *Medulla ſpinalis* appellatus, ex quo multi emergunt ſurculi, nomine *nervorum* inſigniti. *Varolius* Anatom l 1. c. 13. p 12.

rum ſeem to riſe, which *Anatomiſts* deſcribe. And this *ſubtilty* of Mr. *Glanvill* is ſo little regarded by late *Anatomiſts*, that *Mœbius* (a man of as great note as moſt are) ſlights *it* by the example of *Hofman*, whoſe ſenſe I ſhall here report: *Monendi ſunt adoleſcentiores, ne forte morentur illos qui neglecta veteri diſtinctione dicunt, Omnes nervi ſunt a medulla, ſed alii ex illa, antequam cranio excidat, alii ex eadem, cum jam in ſpinam delapſa eſt, & Spinalis dicitur. Quid enim hoc aliud eſt, quam fruſtranea nominum novatio? Cum dico me de nervis ex cerebro ortis acturum, intelligo totum id quod cranio continetur.* There is another *Origination* of the *nerves*, which is as ancient as *Ariſtotle*, and which *Hofman* and *Vander Linden* aſſert, whereby they are deduced *immediately* and *formally* from the *brain*, but *immediately* and *materially* from the *heart*; for ſo much as they hold each *nerve* to be an *Artery* veſted with the *membranes* of the *brain*, and ſo iſſuing to ſeveral parts. This opinion is very agreeable to the *obſervations* that occurre in the *practice of Phyſick*, and *their* arguments ſeem to me ſo *plauſible*, that I am ſo averſe with Mr. *Glanvill* to proclaim a *new origination of the nerves*, that I much doubt whether the *followers of Galen* were not deceived, and the *Peripateticks* in the right. See *Vander Linden* Diſp. 38. *de vaſis & nervis*, and *Hofman de partib. ſimilar. in theſ. de orig. nerv. ſec. Ariſtot.*

Mœbius fundament med. c. de uſu nervor. p. 606. *Caſpar Hofman.* inſtit. med. l. 2. c. 65. ſect. 1.

So Dr. Charlton *in his Diſcourſe to the* Royal Society *concerning the* Brain, *takes the liberty to underſtand by the* Cerebrum *as well as others*, totum illud corpus quod Calvariæ concavo continetur (*pag.* 67. de Propr. cerebri humani) *though afterwards, when he comes to ſpeak more accurately, he treats of the* Medulla oblongata *thus*: Cerebro proxime ſubjicitur alma nervorum ad ſenſus ſpectantium mater, & *funis argentei* (ſicut *Sapiens* in *Eccleſiaſte* eleganti ſed obſcura Allegoria vocat *Medullam ſpinalem*) principium *Medulla* ſcilicet *intra cranium oblongata*. Behold the addition of Mr. *Glanvill!*

It is clear now that Mr. *Glanvills* new addition amounts onely to this, that the *Ancients* did ſome of them hold that the *nerves* had their original from the *brain*; others deduced them from the *heart*. Some (perhaps before *Varolius*) did ſubdivide the *brain* into ſeveral parts, and ſaid that the *nerves* had their origination from the *medulla oblongata*, and not from the *cerebrum* and *cerebellum*. This nicety Dr. *Willis* makes ſome uſe of, but ſince *he* explicates no-

Vide *Varolium* l. 1. c. 3.

If Varolius *found it out, as I believe he did, by a peculiar way of diſſecting the head, what is it that Mr.* Glanvill *then* ADDS? *I am ſure that* Fracaſſatus *ſaith, Varolius* primus principium *ſpinalis medullæ* vel intra *cranium* ſoboleſcere in nervos, quorum origo olim à cerebro petebatur, docuit.

thing of the *brain* with a *mechanical accurateneſs*; I ſhall only ſubjoyn, that whoſoever ſhall *view* or *eat* that which they call *Medulla oblongata & ſpinalis*, and compare it with the *marrow* that is in the *bones* otherwiſe, *he* will think it a leſs *impropriety of ſpeech*, to ſay the *Medulla oblongata* is a part of the *brain*, then to term it a *Medullary ſubſtance*.

" *And though the* Succus Nutritius *be not yet fully agreed* " *upon by* Phyſicians, *yet it hath ſo much to ſay for it ſelf, that* " *it may not unreaſonably be mentioned amongſt the* new " Inventions—— It's ſtrange Mr. *Glanvill* ſhould entitle *this opinion* about the *Succus Nutritius* to ſo great a degree of *probability*, as he doth. *Phyſicians* are ſo far from being *fully agreed* upon it, that, excepting Dr. *Gliſſon*, Dr. *Charleton*, and perhaps *one* or *two* more, the reſt do generally reject it. Dr. *Highmore*, Dr. *Willis*, and *Bartholine* have written againſt *it*; and ſo hath *Deuſingius* writ a particular diſcourſe againſt it. Nor do I doubt, but whoſoever peruſeth thoſe *Authors* which I refer unto, will be ſo far from imagining it reaſonable to aſcribe the *Succus Nutritius* to the number of *modern Inventions*, that *he* will term it at beſt but an *ingenious Paradox*, which when the firſt *ſurpriſe* is over, vaniſheth with the appearance of being *ridiculous*. How much doth our *Virtnoſo*, and *Bartholine* differ? *Prodeat Herophilus, ex antro educatur Democritus, advocentur proſectores cujuſcunque ſortis & ætatis, ſi in diſſectis corporum nervis ullum invenerint liquorem nutritioni opportunum, nolim inter eos locum mereri.*

Highmore de affect. hypochondr. c. 4. *Willis* in Anatome cerebri c. 20. *Bartholin* ſpicileg. 1. c. 3.

Bartholin. ſpicileg. 1. de vaſis lymphat p. 23.

" But of all *Modern Diſcoveries*, *Wit* and *Induſtry* have " made in the *Oeconomy* of humane nature, the nobleſt is that " of the *Circulation of the blood*, which *was* the invention of " our deſervedly famous *Harvey*. 'Tis true, the *envy* of *ma-* " *licious* Contemporaries would have robb'd him of the *Glory* " of this *Diſcovery*, and pretend it was known to *Hippocrates*, " *Plato*, *Ariſtotle*, and others among the *Ancients*; but who- " ever conſiders the expreſſions of thoſe *Authors*, which are " ſaid to reſpect the *Circulation*, who finde that thoſe who " form the *inference*, do it by a *faculty* that makes all kind " of *Compoſitions* and *Deductions*, and the ſame that aſſiſts

Plus ultra, pag. 15.

" the

"the *Enthuſiaſts* of our days, to ſee ſo clearly all our alterations of *State* and *Religion*, to the *minuteſt particulars* in "the *Revelation* of Saint *John*. And I think it may be as well concluded from the firſt chapter of *Geneſis*, as from "the *remains* of thoſe *Ancients*, who if *they* had known "this *great* and *general Theory*, how chance they ſpeak no "more of a thing, which no doubt they had frequent occaſions to mention? How came it to be loſt without "Memory amongſt their followers, who were ſuch *ſuperſtitious Porers* upon their Writings? How chance "it was not ſhewn to be lodged in *thoſe Authors* before the "days of Dr. *Harvey*, when *Envy* hed *impregnated* and determined the *Imaginations* of thoſe who were not willing any thing ſhould be found anew, of which themſelves "were not the *Inventours*? But 'tis not only the *remoteſt* Ancients, whom time hath *conſecrated*, and *diſtance* made *venerable*, whoſe *Aſhes* thoſe *fond men* would "honour with *this diſcovery*; but even much *later* Authors have had the glory faſtned upon them. For the "Invention is by ſome aſcribed to *Paulus Venetus*; by others to *Proſper Alpinus*; and a third ſort give it to "*Andræas Cæſalpinus*. For *theſe*, though either of them "ſhould be acknowledged to be the Author, it will make "as much for the deſign of my diſcourſe, as if *Harvey* "had the credit: and therefore here I am no otherwiſe "concerned, but to have *juſtice* for that excellent man: "and the World hath now done *right* to his *Memory*, "*Death* having overcome that *Envy* which *Dogs living* "*vertue* to the *Grave*; and his *Name* reſts quietly in "the Armes of *Glory*, while the *Pretenſions* of his *Rivals* "are creeping into *darkneſs* and *oblivion*.

Whether thoſe that have gone about to deprive Dr. *Harvey* have been incited by *Envy* and *Malice*, it is hard for any *conſiderate* man to judge; ſince thoſe which firſt propoſed the *doubt* about the *Author*, were great friends to the *Theoreme*; ſuch as *Walæus*, who firſt mentioned it; *Riolanus*,

Riolanus, *Nardius*, *Fracaſſarus*, and *Joannes Antonides Vander Linden*: All of them pay a great *reſpect* to Dr. *Harvey*'s Performances; All of them concur with him *generally* in *his Aſſertions*, ſaving that *Riolanus* made ſome variation *therein*, and perhaps his *paſſion* might blinde his *candour*; though *I do not think ſo*, becauſe *I* finde him zealouſly vindicating of Dr. *Harvey* from thoſe imputations by which *Walæus* endeavoured to transfer the credit of the *invention* upon Father *Paul*.

Another thing *I* muſt take notice of is, that Mr. *Glanvill* ſpeaks very peremptorily about a thing he hath not enquired into, for it is evident that he never read the paſſages out of the *Ancients*, which are cited by *Walæus* and *Riolanus*, to to ſhew they were not altogether ignorant of that *motion of the bloud* which is called *Circulation*. He thinks *it may be as well concluded from the firſt chapter of* Geneſis, *as from the remains of the Ancients*. And why ſo? Is there any thing mentioned in the firſt chapter of *Geneſis*, that ſounds like the *Circulation of the blood*, or any words that can be applied unto this *late diſcovery*? not one. But any man that underſtands Greek, muſt confeſs that the words ἄμπωλις, πλημμυρὶς, and περίοδος in *Hippocrates* (whatever he meant by them) do moſt *emphatically* ſignifie the *Circulation of the blood*, as it is now propoſed. If *I* merit not to be believed *herein*, take the judgement of *Julius Cæſar*, *Scaliger* upon *Ariſtotle* de inſomn. xiij. 1444. Πολλαὶ δὲ μὴ κατὰ τόπον γινόμεναι, αἱματος περίοδον σημαίνουσι. *I* ſhall not from this place deduce the myſtery of the *Circulation of the blood*, by ſaying that *rivers* circulate *under ground* thorough that *ſandy earth*, which thoſe that dig in Wells, when they come unto, they can deſcend no further: (which *Helmont* in the *Brabant* Dialect calls *Quellem*, other *Dutch-men* name *Well-ground* and *Well-ſand*) and after return unto the *Sea* again by *open Channels*: But whatever the intent of the *Philoſopher* was, that αἱματος περίοδος, properly imports *ſuch a thing*, and that we have the *name* given it by *Ariſtotle*, this *Scaliger* confeſſeth, *Ejus ad apoteleſma* xxxi. *hæc ſunt verba* Αἱματος περίοδον, *motum; ut infebribus acceſſionem.* Circuitum

Galvus

Calvus cum dicit, fideliter, *non plene explicat. Neque enim. circumducitur sanguis*, ut περιόδου *impleat significationem Nam in febribus idcirco* dicitur περιόδος, *quia revertitur paroxysmus: quasi circumductus ob diem parum & vacuum a morbo.* From which it is evident, that if *Scaliger* had known that the blood had *circulated*, he would have granted it to have been *properly* expressed here in the *Text*: which is more then *He* would say of any *Apocalyptical* discoveries, or *deductions* of that opinion out of the first Chapter of *Genesis*. And if the word περίοδος be so *significant*, it is hard to deny that *Hippocrates* did not set down the thing it self in this passage, Αἱ φλέβες διὰ τοῦ σώματος κεχυμένας, πνεῦμα, καὶ ῥεῦμα, καὶ κίνησιν παρέχονται· ἀπὸ μιῆς πολλαὶ διαβλαστάνουσι. Καὶ αὕτη μὲν ἡ μία ὅθεν ἤρξαται, καὶ ἢ τετελεύτηκεν, οὐκ οἶδα. Κύκλου γὰρ γεγεννημένου, ἀρχὴ οὐχ' εὑρέθη. *Venæ per corpus fusæ spiritum, & fluxum, & motum præstant. Ab una multæ propagantur: sed illa una unde incipiat, aut ubi desinat, non scio.* Circulo *enim* ducto, *principium non invenitur.* And in that other; Ἐς τρίχας τροφὴ, καὶ ἐς ὄνυχας καὶ τὴν ἐσχάτην ἐπιφανείην ἔνδοθεν ἀφικνέεται. Ἔξωθεν τροφὴ ἐκ τῆς ἐσχάτης ἐπιφανείης ἐνδοτάτω ἀφικνέεται. Ξύῤῥοια μία, ξύμπνοια μία, ξυμπαθέα πάντα. Κατὰ μὲν οὐλομελίην πάντα· κατὰ μέρος δὲ. τὰ ἐν ἑκάστῳ μέρει μέρεα πρὸς τὸ ἔργον Ἀρχὴ μεγάλη εἰς ἔσχατον μέρος αφικνέεται. Ἐξ ἐσχάτου μέρεος εἰς ἀρχὴν μεγάλην αφικνέεται. *In pilos alimentum* [id est, sanguis nutriens] *& in ungues, atque extremam superficiem intus advenit: færis alimentum ab extrema superficie intime revertitur. Corrivatio una, conspiratio una, consentientia omnia. Certe quod ad communem naturam omnia: in quavis parte partes ad opus. Principium magnum* [id est Cor, per transmissos spiritus & sanguinem] *ad extremam partem pervenit: ab extrema parte ad principium magnum revertitur.* There are more passages in the same *Authour* which seem to *import* the same thing, though his usual *brevity* and *obscurity* is such, that had not *Harvey* and others dilucidated the point, we had never, I believe, fixed *this explication* upon him, which amounts to no more then a *new gloss upon an old Text*: which yet is sufficient to check the largeness of Mr. *Glanvills* assertion. The περίωσις of *Plato*, and his making the *Heart* to be the *original*

Hippocrates de oss. nat. t. 17.

Ex lib. de alim. t. 4 12.

of

Plato in Timæo.

of the veins, καὶ τοῦ περιφερομένου κατὰ πάντα τὰ μέλη σφοδρῶς αἵματος; these are something more then is to be found in the first of *Genesis*. And that passage of *Aristotle* de Gen. Anim. l.4. c.ult. is so unlike any thing of *Moses's*, and so like to the doctrine of *Harvey*, that any man must blame Mr. *Glanvill*, for rashness of what he says. The words are thus set down by *Riolanus*, and I have not the *Original* by me to consult: *Cum cœlestia corpora circulariter moveantur, inferiora corpora motum illum imitari debent, cumque Oceanus fluxu & refluxu moveatur ab influxu Lunari, similiter humores talem motum habere necessum est.* Which words seem clear enough, so as to justifie the *Epiphonema* of my *Author*, in opposition to our *Virtuoso*. *Quid ista significant nisi sanguinis Circulationem.* He that would be informed *more fully* about the judgement of the *Ancients*, whether there be any thing in them that discovers the *Circulation of the blood*, to have been known unto *them*; or that they were not *totally ignorant*, and without *any apprehensions* of it: let him reade the first letter of *Walæus*, and the several Pieces of *Joannes Riolanus* about the *Circulation of the blood*, and the disputations of *Vander Linden* about the *Circulation of the blood*, in which *he* vindicates it in a *prolixe discours* unto *Hippocrates*. I wil not trouble my *self* to transcribe *them*: It is evident that *all men* do give unto *Harvey* the credit of having so explicated it, and *Anatomically* proved it, that he may as well be termed the *Author* of it, as *Epicurus* and others the *Authors* of that *Philosophy* which they derived from *Pythogoras*, *Democritus*, *Leucippus*, and *Ocellus Lucanus*. Nor hath *Harvey* any other *Plea* and *Right* to the *Invention*, then that *he* did more *fully* and *perspicuously* declare *it*, and in the most *judicious* and *solid* manner assert what others had but *hinted* at, or *faintly* insisted on.

Nor is Mr. *Glanvill* any better acquainted with the notions of the *Modern Writers*, then he is with those of the *Ancients*. He saith, that *some have ascribed the Circulation of the blood to Paulus Venetus*. I must inform the Reader (who may easily mistake, if he be one of the ordinary *Comical Wits*) that it is not to be ascribed to *Paulus Venetus*, the great *Traveller*,

veller, who is generally understood, when *that name* is mentioned; none can say that *he* brought it from the Kingdom of *Cathay*. But *Pater Paulus Sarpa* (or *Serpa*) or Father *Paul*, the famous *Venetian* Monk, of the order of the *Servi*; who signatised himself during the time that *Venice* was interdicted. He was a Student at *Padoa* at the same time that *Harvey* was there, and discovered to *Aqua pendens* the *valves in the veins*, which discovery that great *Anatomist* appropriated to himself; and so *Harvey* was thought to have abused the same *Father*. But since *Fulgentio* in the life of *Padre Paolo* doth not challenge *Harvey* for this Cheat, as he doth *Fabricius* for that other; and since *Marquardus Slegelius* could not hear of any such thing upon a strict Enquiry at *Venice* and *Padua*, I know not any since *Walæus* and *Franciscus Ulmus*, that have ascribed the invention to *Paulus Venetus Servita*.

Vide *Slegel.* de motu Sanguin c. 2. & *Riolan.* in not. ad ep. *Walæi.*

Neither did I ever reade of any man that attributed it to *Prosper Alpinus*: nor is it credible that any *ever* did so. For that great *Physician* established his *glory* by being an excellent *Practitioner*, and not by any *Anatomical* curiosities, which he rather *contemned*, then pursued: and till I know what Author Mr. *Glanvill* follows, I believe the mentioning of him was occasioned by that way of discoutse which is common to the *Wits* of this Age, to *blunder out any thing*: and by *laughing* at *improbabilities* (of their *own* suggestion) to explode *substantial truths*, or represent them as *forgeries*. But if any did deceive the world in attributing the *Circulation of the blood* to *Padre Paolo* and *Prosper Alpinus*, it doth not follow but that *Andreas Cæsalpinus* was the *first Inventor* of *it*, and proposed it to the world in his *Medical* and *Peripatetical Questions*, though not in any Set Discourse, but as it *casually* falls into the discussion of other *Problems*: Whereupon it was *little regarded*, and not enquired after; the *book* being also *scarce*, and *he* being of that *faction* of *Physicians* which adheres to *Aristotle* against *Galen*, whence it hapned that few read his *Paradoxes*, and one of the bravest men of the latter Age hath been almost buried in oblivion. However, an ingenious *Florentine*, call'd *Joannes Nardius*,

hath asserted the repute of *Andræas Cæsalpinus*, for precedency to *Harvey* in the *Discovery*; nor doth the same *Author* doubt, but that *Erasistratus* was of the same opinion: but he saith of *Cæsalpinus* this: *Fœlix cui contigit post mortem nanciſci clariſſimum Patronum Guglielmum Harveium Regium Medicum, nobiſque per charum, qui abortivam illam opinionem excoluit adeo, ut nihil cultius noſtro ſeculo, nilque mirabilius occurrerit curioſis & amænarum literarum amatoribus.* To decide this *queſtion*, and to put an *end* to thoſe *diſputes* which trouble ſome of our *Virtuoſi* ſo much, by reaſon of that *little* converſe they have with *Books*, I ſhall draw out the opinion of *Cæſalpinus*, as he expreſſeth himſelf in his *Diſputations*.

Andræas Cæſalpinus Qu. peripatet. l. 5. qu. 3.

As a great abettour of *Ariſtotle*, he avows that the *Heart* is the principal part in man, and the original of the *veins*, *arteries*, and *nerves*; which is the opinion of *Hofman*, *Van der Linden*, and other Ariſtotelian Phyſicians.

Ib. qu. 4.

He deſcribes the *Fabrick* of the *Heart* as exactly as any of the *Circulators* in reference to the *Valves*, ſo much *talked* of; but he declares not their ſhape: *Vaſorum in Cor deſinentium quædam intromittunt contentam in ipſis ſubſtantiam, ut vena Cava in dextro ventriculo, & arteria venalis in ſiniſtro: quadam educunt, ut arteria aorta in ſiniſtro ventriculo, & vena arterialis pulmonem nutriens in dextro: omnibus autem membranule ſunt appoſitæ & officio delegatæ, ut oſcula intromittentia non educant, & educentia non intromittant.*

And for the account of the *Vena arterioſa*, and *Arteria venoſa* in the Lungs, *Harvey* is not more perſpicuous, then he is afterwards, where he makes the one to be an *Artery*, the other a *veine*, viz. *Putaverunt autem Medici uſum hunc non videntes commutatæ fuiſſe vaſa in pulmone, ut Arteria quidem ſimilis eſſet venæ, vena autem ſimilis Arteriæ: appellantes venas vaſa omnia quæ in dextrum ventriculum deſinunt, Arterias autem, quæ in ſiniſtrum: figmenta multa & abſurditates excogitantes ut uſum invenirent. Pulſat igitur in pulmone vas dextri ventriculi, hæc enim e corde recipit, ut Arteria magna, & ſimiliter fabricatum eſt ejus corpus. Vas autem ſiniſtri ventri-*

culi

culi non pulſat, quia introducit tantum, & ejus corpus ſimile eſt reliquis venis.

He holds that the *motion* of the *Heart* and *Arteries* depends not upon any *pelſifick Faculty*, but that it ariſeth from the ὀγχωσις, ebullition, or *effervescency* of the blood in the Ventricles; and that the *Heart* and *Arteries* are *dilated* at the ſame time, the blood dilating the *Heart*, and iſſuing out thorough the *valves* of the *Aorta* and *Pulmonique Artery* at the ſame inſtant, which is pure *Carteſianiſm*.

He holds that the *Blood* comes up from the *veins* to the *Heart*, and there acquires the laſt *Perfection*, and becomes vital and *ſpirituous*: in the mention of the *Arterious Blood*, he uſeth indifferently the termes of *Blood*, *ſpirit*, and *natural heat*, which I deſire may be obſerved, leſt the *proofs* ſeem not *full enough*, and he be conſtrued to ſpeak of nothing but *ſpirits* and *natural heat* in the *Arteries*. He ſaith, that this *Blood* having acquired its *Perfection* in its paſſage through *both the ventricles*, is diſtributed through all the parts of the *body*, for its nutriment by the *Arteries*, in which *Arteries* there is ſuch a conſtant quantity of *Blood*, that the effervency of that in the *Heart* impells the whole continuation of the *Arteries*, ſo that they beat *all at once*. *Cum enim pulſatio Cordis & Arteriarum ſit accidens quoddam quod ex neceſſitate inſequitur humoris in corde effervescentiam, qua ſanguinis generatio perficitur, ut in cæteris quæ igne elixantur, accidit. lib. de vita & mort. c. 2. intumeſcente corde neceſſe eſt ſimul omnes Arterias dilatari, in quas derivatur fervor: non enim repleri poteſt una pars, quin totum fiat majus: ubi non omni ex parte vaſa quæ continua ſunt fuerint exinanita. Nam nullo intus exiſtente corpore, non contingit ſimul repleri principium & extrema, cum motus non fiat in inſtanti: exiſtente autem per totos canales aliquo ſpiritu, ſimul ac in principio alius fuerit genitus, neceſſe eſt totum ſimul dilatari, unum enim ſit ſpiritus accedens cum toto. Cum ergo totum reddatur majus ſimul ac acceſſerit pars, non poteſt una pars dilatari, quin eodem tempore dilatetur totum.*

Mark this, where he makes the *Heart* and *Arteries* to be one continued receptacle of *perfect blood*: by which you must explain what he says in some places, as if only *spirits* or *natural heat* went into the *Arteries*, or returned by the *veins*.

Est autem veluti totum quoddam Arteriæ omnes cum corde; Continuum enim est vas sanguinis perfecti. Spiritu autem efflante inhabitum corporis, & distributo particulis sanguine, necesse est tumorem vasorum desidere, quæ est pulsus contractio. Continue autem hoc fit, quia continua est partium nutritio, & continua sanguinis generatio in corde. Elevatio igitur Spiritus a calore fit, non tamen temere, sed alicujus gratia. Nam sine hujusmodi amplificatione non fieret distributio alimenti in omnes partes.

He plants a kind of *Flammula cordis*, or fire in the *heart*, which causeth the *ebullition*, and imprints a *spirituousness in the blood* that issueth out into the *Arteries*. *Hujusmodi locus Cor est in quo secundum Naturam elementum præparatum ardere possit, & fieri spiritus: venæ alimentum suppeditant, Arteriæ flammæ spiritum recipiunt.*

He saith, that the *Blood* moves towards the *Heart*, as the *Oyle* to the flame of the burning *Lamp*, and that the *Valves* as the orifice of the *Vena Cava* which immit the blood, are placed there to moderate the *source of the blood*, lest it should fall in *too fast*, & extinguish the *vital fire*: and that the *valves* at the entrance of the *Aorta* do flie open upon the *effervescency* of the *blood*, by the pressure of it every way, to get more room: it finding no *out-let* but by those yielding *valves*, which were so placed, lest upon any *accident*, or violent *passion*, the *arterious blood* should regurgitate into the *Heart*, *Motus fit ex venis in Cor caliditate alimentum trahente, ex corde autem in arterias, quia hac solum patet iter propter membranarum positionem, positæ autem sunt hoc modo membranæ, ne unquam contingeret contrarium motum fieri, quod accidere posset in vehementibus animi perturbationibus, aut aliis causis, a quibus sanguinis retractio fit ad Cor: Obsistunt enim huic motui membranæ. Nam si hoc modo condite non essent, ignis cordis vel levi causa extingueretur. Si enim motus fieret contrarius simile esset, ac si flamma compingeretur deorsum ad alimentum, quod cum minime sit præparatum, aut copiosius quam oportet, ignem suffocat. Oportet enim alimentum præparari, & paulatim dispensari ad locum flammæ.*

He saith that this *arterious blood*, or *spirit*, is distributed into

into all parts of the *body*, with great *celerity*, and that it is that which *nouriſheth the parts*: and that upon its diffuſion into the *habit of the body*, the *ſpirits* are very much *exhauſted*, and the *corpulent* part of the *aliment* doth remain, being coagulated partly by *heat*, and partly by *cold*.

He ſaith, that the variety of the *pulſe*, as to *ſtrength* or *debility*, *celerity* and *ſlowneſs*, depends upon the nature of the *vital fire*, the nature of the *aliment* with which it is fed, and ſometimes upon the particular *Fabrick*, or conformation of the *Heart*, in which that *Fire* is ſeated.

He placeth *Anaſtomoſes* betwixt the *veins* and arteries every where in the body. *Oſculorum communio eſt non ſolum in corde, ſed etiam per totum venerum & arteriarum ductum,*

He ſaith that the blood is never *extravaſated*, but where it is aggregated to any part by way of *nouriſhment*, or elſe it *putrifies*: he doth not underſtand how it ſhould not *coagulate* if once *extravaſated*; nor can he comprehend how it ſhould be reaſſumed into the *veins* in ſuch a caſe. *Venam continuam eſſe oportet, uſque ad cordis ventriculos, ut inde omnis virtus deſcendat: nec ullibi contingit disjunctam eſſe; ſanguis enim calore cordis deſtitutus concreſcit, & tandem putreſcit.*

He makes the *Blood* to paſs betwixt the *right* and *left* ventricle of the *Heart*; partly by the *Lungs*, and partly by the *Septum Cordis*. *Pulchre igitur condita ſunt omnia. Cum enim fervere oporteret in corde ſanguinem, ut fieret alimenti perfectio: primo quidem in dextro ventriculo, in quo craſſior adhuc continetur ſanguis, deinde autem in ſiniſtro, ubi ſincerior ſanguis eſt: partim per medium ſeptum, partim per medios pulmones refrigerationis gratia ex dextro in ſiniſtrum mittitur. Interim autem pulmo abunde nutriri poteſt: totum enim eum ſanguinem abſumere, quem recipit, egreditur fines rationis. Non enim rara eſſet ejus ſubſtantia & levis, ut videtur ſi tantum alimenti, vim in ſuam naturam converteret.* This he thus further explains. *Pulmo per venam arteriis ſimilem ex dextro cordis ventriculo fervidum hauriens ſanguinem, eumque per anaſtomoſin arteriæ venali reddens quæ in ſiniſtrum cordis ventriculum tendit, tranſ-*

miſſo

missō interim aere frigido per asperæ arteriæ canalis, qui juxta arteriam venalem protenduntur, non tamen osculis communicantes, ut putavit Galenus solo tactu temperat. Huic Sanguinis Circulationi ex dextro cordis ventriculo, per pulmones in sinistrum ejusdem ventriculum optime respondent ea quæ ex dissectione apparent. Nam duo sunt vasa in dextrum ventriculum desinentia, duo etiam in sinistrum. Duorum autem unum intromittit tantum, alterum educit, membranis eo ingenio constructis. Vas igitur intromittens, vena est magna quidem in dextro, quæ cava appellatur: parva autem in sinistro, ex pulmone introducens, cujus unica est tunica, ut cæterarum venarum. Vas autem educens Arteria, est magna quidem in sinistro, quæ Aorta appellatur, parva autem in dextro ad pulmones derivans, cujus similiter duæ sunt tunicæ, ut in cæteris arteriis.

He holds that the *spirituous* or *arterious blood* is cast out, and diffused vigorously into the *habit of the body*, that the *veins* and *arteries* being continuous by *Anastomosis*, it returns to the *Heart* again, vigorating the blood of the *vena porta* and *Cava* as it returns: which is sufficiently intimated in that he deduces all the *vigour* and *vitality* of the *blood* from the *Heart*, and that this vigour or *natural heat* is carried over the body by the *Arteries* alone, and that it is necessary that the whole *venous Systeme*, or contexture of *Arteries* and *veins* be *continuous*, lest the blood in the *veins*, being destitute of the *cordial heat*, should *coagulate* and putrifie. *He* holds that this *motion*, or *Circulation of the blood* is without intermission: and that the swelling of the *veins* upon the *Ligature* is a sufficient proof of it. But *he* holds, that the recourse of the blood by the *veins* is greater in the *sleep*, then when we *awake*; which he proves thus, in that the *veins* are more full and tumid during *sleep*, then *waking*: and the *pulse weaker*, and more *slow*; as any man may observe. From whence *he* concludes, that the *natural heat* (which is the *Arterious blood*, as I observed before, to prevent all possible mistakes) which was otherwise in great part expended upon the *nerves* and *sensories*, doth in *sleep* return: and fill the *veins* more *visibly* (that exhaustion ceasing) then when we are not *asleep*.

His

His opinion will be beſt ſet down in his *own words*; and I think it neceſſary to do it, becauſe *Nardius* hath done it ſo *imperfectly*, that one would attribute as little to his *allegations*, as to thoſe which are cited out of the *Ancients*; and if I had not read *Cæſalpinus* long before, I ſhould have thought the *Florentine* to have intitled *Cæſalpinus* to the opinion out of envy to *Harvey*, or out of a partial deſire to advance the glory of the *Tuſcan* Academy at *Piſa*, when *Cæſalpinus* was Profeſſour. Thus that learned man writ about the year 1590. or a little after.

Andræas Cæſalpinus Queſt. Medic. l. 2. Qu. 17. edit. venetæ ſecunda in 4to. A.D. 1593. fol. 234.col. 1.

'Sed illud ſpeculatione dignum videtur, *Propter* 'quod intumeſcunt venæ ultra locum apprehenſum, non 'citra: quod experimento ſciunt qui vena ſecant: 'vinculum enim adhibent citra locum *ſectionis*, non 'ultra: quia tument venæ *ultra* vinculum, non *citra*. 'Debuiſſet autem oppoſito modo contingere, ſi *motus ſanguinis* & *ſpiritus* a viſceribus fit in totum 'corpus: intercepto enim meatu, non ultra datur pro'greſſus: tumor igitur venarum *citra vinculum* de'buiſſet fieri. An ſolvitur dubitatio ex eo quod ſcri'bit *Ariſtoteles*, de Som c. 3. ubi inquit, *Neceſſe enim* 'quod evaporatur aliquouſque impelli: deinde converti '& permutari, ſicut Euripum: calidum enim cujuſque 'animalium ad ſuperiora natum eſt ferri: cum autem 'in ſuperioribus locis fuerit, multum ſimul ite'rum revertitur, ferturque deorſum. Hæc *Ariſtoteles*.

Pro

'Pro cujus loci explicatione illud ſciendum eſt: 'Cordis meatus ita a natura paratos eſſe, ut ex *vena* 'Cava intromiſſio fiat in *Cordis* ventriculum *dex-* 'trum, unde patet exitus in *pulmonem*: ex pulmone 'præterea alium ingreſſum eſſe in *Cordis ventriculum* 'ſiniſtrum, ex quotandem patet exitus in *Arteriam* 'Aortam, membranis quibuſdam ad oſtia vaſorum 'appoſitis, ut impediant retroceſſum: Sic enim 'perpetuus quidam motus eſt ex vena cava per *Cor* & 'pulmones in *Arteriam Aortam*: ut in *Quæſtionibus* 'Peripateticis explicavimus. Cum autem in *vigilia* 'motus caloris nativi fiat extra, ſcilicet ad ſenſoria: 'in *Somno* autem intra, ſcilicet ad *Cor*: putandum 'eſt in vigilia multum ſpiritus & ſanguinis ferri ad ar- 'terias, inde enim in nervos iter eſt. In ſomno au- 'tem *eundem calorem* per *venas* reverti ad *Cor*, non 'per *Arteriam*. Judicio ſunt pulſus, qui expergiſ- 'centibus fiunt magni, vehementes, celeres, & cre- 'bri, cum quadam vibratione: in ſomno autem 'parvi, languidi, tardi & rari notante *Galeno*. 3. *de* 'cauſ. pul. 9, 10. Num in *Somno calor nativus* minus 'vergit in *arterias*: in caſdem erumpit *vehementius* 'cum expergiſcuntur. *Venæ* autem contrario ſe 'modo habent: nam in ſomno fiunt tumidiores, in 'vigilia exiliores, ut patet intuenti eas quæ in manu 'ſunt. Tranſit enim in ſomno *calor nativus ex ar-* 'teriis in venas per oſculorum communionem, quam *A-* 'naſtomoſin vocant, & inde ad *Cor*. *Ut autem ſangui-* 'nis exundatio ad ſuperiora, & retroceſſus ad inferiora 'ad inſtar Euripi manifeſta eſt in ſomno & vigilia, ſic

'non

non obscurus est hujusmodi motus in quacunque parte corporis vinculum adhibeatur, aut alia ratione occludantur venæ. Cum enim tollitur permeatio, intumescunt rivuli qua parte fluere solent.

From *hence* it is *clear* that *He* held that the *blood* did *circulate* continually, falling into the *Heart* by the *vena Cava*, and issuing out by the *Aorta* into all parts of the body: that *this* motion of the blood was perceivable by the *Ligatures* at any time, but *most manifest* in the *intumescence* of the veins in *sleep*: at what time also the *blood* or *natural heat* (which is all one to him) did pass by way of *Anastomosis* out of the *arteries* into the *veins*, as well *as at other times*. So that we are not to imagine any *interrupted circulation* in *him*, but that it did constantly flow *night* and *day*, sleeping and waking, though with *unequal celerity*. In letting of *blood* he tells us, that the blood which first issues out is *venous*, and blacker then that which follows, and comes more *immediately* out of the *Arteries*. ——*Venas cum Arteriis adeo copulari osculis, ut vena secta primum exeat sanguis venalis nigrior; deinde succedat arterialis flavior, quod plerumque contingit.* And he explains the *motion of the blood*, and *natural heat* thus, to prevent all ambiguity. *At instabit quis in somno nequaquam prohiberi calorem in cerebro & sensoriis: pulsant enim arteriæ in toto corpore etiam in somno. At præsente calore innato debuisset duci in actum facultas animalis.* An *calor innatus in somno viget in venis & arteriis, non in nervis sine quibus, non sit sensus & motus?* Extra *igitur* ferri *est nervos* petere, *intra autem non solum ad viscera, sed in omnes venas & arterias; unde operationes naturales magis perficiuntur in toto corpore.*

Qu. *Med.* l. 2. *qu* 5 fol. 212. col. 1. lit. 6.

Qu. *Med.* l. 2. *qu.* 15. *fol.* 230. col. 1. l. c.

I hope I have now determined the *Question* which hath occasioned so many heats in the world concerning the *Circulation of the blood*, who was the *first Inventor* of it? I have demonstrated that *Andræas Cæsalpinus*, a rigid *Peripatetick* upon *sensible Experiments* & *Mechanical considerations*, not *notional apprehensions*, did not only discover this *motion* of the blood

(even *through the Lungs*) but gave it the name of *CIRCULATIO SANGUINIS*; which name is not so proper *in it self*, considering the *Fabrick* of the *veins* and *arteries*, and the *Labyrinth* in which the *blood* moves *universally*, describing a *Line* no way *circular*, as that a man would have pitched upon it in any other *Age* then when *Cæsalpinus* lived, when the *knowledge of the Learned Languages* was less *general* then now, and such a *barbarous stile in fashion*, as our *Inventour* used. But it was not so in the days of Dr. *Harvey*, who published his Treatise in 4to. at *Francfourt* in the year (as I take it) 1628. I must confess I am apt to think upon this consideration, that Dr. *Harvey* (who was a *Peripatetique* Physician, and in whose time at *Padoa*, those *Physicians* did flourish with the greatest repute of *Learning* and skill in *Anatomy*, as well as *Philosophy*) did take up this opinion from *my Author*. And although there wanted not occasion by reason of what *Walæus*, *Riolanus*, *Slegelius*, and *others* had said upon the *point*, for him to declare the *original of the discovery*, yet in his *two* Answers to *Riolanus*, and his Book of *Generation*, He no where asserts the *Invention* so to *himself*, as to deny that he had the *intimation* or *notion* from *Cæsalpinus*; but leaves the *Controversy* in the *dark*: which *silence* of his I take for a *tacite Confession*. His *Ambition* of *Glory* made him willing to be thought the *Authour* of a *Paradox* he had so illustrated, and brought *upon the Stage*, when it lay *unregarded*, and in all probability *buried in oblivion*. Yet such was his *Modesty*, as not to vindicate it to *himself* by telling a *Lie*. And such his *Prudence*, as rather to avoid the *debate*, then resolve it to *his prejudice*. Had Dr. *Harvey* been a *Chymist*, I should have guessed that he might have fixed upon the word *Circulation*, upon *other reasons*, and those *congruous enough* to his *Hypotheses*: but since (especially in the days when he writ) those *Studies* were unknown to *him*, and not valued by *him*, I am inclined to think that *He* did receive his first *Intelligence* from this *Professour* at *Pisa* (where *Harvey* also was) and so improved those *hints*, that

Narravit mih. Nobiliss. & Amplissi. *Nicolaus Oudart*, illustrissimi Principis *Auriaci* Consiliarius, meminisse se audire ipsum *Harveium* profitentem se revera primam *circuitus* sanguinis notitiam, & in eum sectione viventium inquirendi occasionem ex *Herioto* accepisse. Fuit is serenissimi quondam Regis *Jacobi* gemmarius, & Ma-

that in the divulging of his *Opinion*, they are as little to be *ſeen*, as the firſt *indeclines* which *Painters* draw in *Pictures* that are *loſt*, when the *Pourtraict* is finiſhed: or as in the *firſt Appearances* of *Plants* above-ground, where thoſe *leaves* and *buds*, which often give *growth* to the ſucceeding *ſtemme*, *flower*, and *fruit*, are *loſt*, or *altered* ſo as not to be *known*. Let it ſuffice, that Dr. *Harvey* had *parts* and *induſtry* enough to have *diſcovered* it, had he not been *prevented therein*. And I ſhould have imagined that our *Countreyman* had found it out, without any communication with thoſe other books (a thing poſſible enough, and of which we have inſtance in the caſe of *Rudbek*, *Bartholine*, and *Jolice*) but that the reaſons I have alledged render the caſe *ſuſpicious*. Had *Cæſalpinus* writ a *diſtinct Treatiſe*, I doubt not but *much of the Glory* had been *his*: ſince there are as great differences between one *Circulator*, and *another*, and greater, then betwixt him and *Harvey*: but his notions being *confuſedly* laid down *here* and *there* in his *Peripatetick* and *Medicinal* Queſtions, and he being not *ambitious* to pretend to any *new diſcoveries*, only to illuſtrate *Ariſtotles* tenets. I ſhall allow *Harvey* the poſſeſſion of his preſent *repute*: nor do I give my ſelf this trouble of collecting up into a *method* theſe *confuſed aſſertions* of *Cæſalpinus* out of any *envy* to the *dead*, but out of *animoſity* to *Pretenders to Wit and Learning*, that *brave* it thus amongſt us; yet if to be ignorant of *what hath paſſed in the world heretofore*, be an argument of *childiſhneſs*, there is not any thing more *puerile* then this ſort of *Virtuoſi*.

I might not diſmiſs my *Reader*, but that the great noiſe which this *Circulation of blood* makes in the World, enforceth me to ſpeak a little more about the *utility* of this *diſcovery*, which our *Authour* deſcribes to be *the moſt noble of all thoſe diſcoveries in the Oeconomy of humane nature, which Wit and Induſtry have made*. I do confeſs I think the *Arguments* for *it* to be ſuch as admit of no Anſwer in *general*;

theſeos perius, eoque nomine Londini celebris. ——— Si verum hoc, veriſimilius quoque eſt, vel *ipſum*, vel *Sarpium*, vel *Heriotum*, a *Caſalpino* accepiſſe. Nemo enim mihi perſuaſerit, ab eorum nemine viſum fuiſſe ſcriptum [*venetiis impreſſum*] quod vel *titulo* ſe, nedum eruditionis varietate atque ſublimitate commendet. *Jo. Artor. Vander Linden* diſput. de circuit. ſangu. exercit. 9. ſect. 196. & exercit. 16. ſect. 582.

but when *we* come to debate *how it passeth through the Lungs*, (which *Riolanus* almost *invincibly* disproves) or *through the Septum Cordis*, (which *Riolan* and *Bartholin* asserts, but *Harvey, Slegelius, Vander Linden*, and others, reject it on good grounds) what it is *that causeth the pulsation of the Heart*? what continues on the *motion of the blood* in the veins, even when a *Ligature* is made betwixt the *antecedent* and *subsequent* blood. Whether *the blood be diffused into the habit of the body, and reimbibed by capillary veins, or conveyed on by Anastomoses*? whether *there be any difference* betwixt the *venous* and *Arterious blood*? How the *Phænomena* (which *undeniably* are observed) about the *pulse* can be made out; and *particularly how some have lived without any Pulse, others* (which I have known) *in the palpitation of the Heart*, suffer no change in their *Pulse*? How *upon dissection or wounds sometimes both ends of the veine divided do bleed? How some bleed at the arme without any Ligature; some upon a double Ligature*? These, and many other *questions*, when I come to dispute with my self, methinks I am forced to constrain my judgement in the *assent* I give to that *Probleme*: and what I am ashamed to deny, *I* finde I cannot own without some *reluctancy*, which is daily encreased in me by *scruples* arising from the *Practick Part of Physick*; nor do I blush to declare my self an Abettour only of such *Tenets*, as are consistent with, and illustrated by *Practical Physick*: it was thought at first that this *Circulation of blood* would overthrow all *the usual Methods of Physick*, and introduce *new* and *beneficiat* discoveries in that part of *Medicine* which is *Therapeutick*. But *Harvey* denieth that it varieth the *Medicine* of the *Ancients*; and *Slegelius* asserts the same opinion, avowing it to be rather an happy illustration, then a *subversion* of the *former praxis*, though it alter the *Theory* much. In fine, those little *advantages* and *Diorismes*, which we derive from that *Invention* merit not our notice; nay, any man shall with more *assurance* bleed in *many diseases* in *sundry manners* and *different places*, upon *diverse indications* upon the *old observations* and *rules*, then on the *new hypotheses*, wherein as to the use of parts, and *nature* of *humors*, there

is

is as little of *clearness* and certainty; as there is *efficacy* in that *practice*, which is *regulated most* thereby.

I had forgot to take notice of the *venæ lacteæ* ascribed to *Asellius*, the invention of them is thought a great discovery, and such as *signatiseth* a man *in this* Age. Yet even those vessels were known to *Galen*, as *Nardius* proveth out of his book against *Erasistratus*, c. 5. and out of the last chapter of his *Anatomical Administrations*. It is true, he calls them *Arteries*; he saith they were in the *Mesentery* filled with *Milk*, and that he observed them in *young Kids*. And *Hofman* in his *Variæ Lectiones* doth produce out of *Galen*, de usu part. l. 4. sect. 19. a place so evidently shewing that *Galen* and *Herophilus* did recover those *Venæ lacteæ*; that *Veslingius* cries out in a Letter to him, *Existimo aut nihil cum Herophilo Galenum vidisse, aut has* Ἰδίας μεσεντερίου φλέβας, *hos ipsos ductus esse, quos* lacteos *cum* Asellio *nominamus*. *Quæ ad Pancreatis* ἀδενώδη σώματα (*ex multarum enim glandularum compage constructum videtur*) *pertinent*. The place in *Galen* is this, as *Hofman* represents it. πρῶτον μὲν γὰρ παντὶ τῷ μεσεντερίῳ φλέβας ἐποίησεν ἰδίας, ἀνακευμένας αὐτῶν τῇ θρέψει τῶν ἐντέρων, μὴ περαιουμένας εἰς τὸ ἧπαρ. Ὡς γὰρ αἱ Ἡρόφιλος ἔλεγεν εἰς ἀδενώδη τινὰ σώματα τελευτῶσιν αὗται αἱ φλέβες, τῶν ἄλλων ἁπάσων ἐπὶ τὰς πύλας φερομένων. Which *proof* as it is perspicuous enough to ruine the discovery of the *Venæ Lacteæ*, and the deducing of *them* unto the *Glandules of the Mesentery* (beyond which *Herophilus* and *Galen* did never trace the *journey of the Chyle*, but imagined those *veins* to nourish the *Mesentery*) so I think that the *invention* of the *Ductus Thoracius* belongs to *Andr. Vesalius*, and *Barthol. Eustachius*: the one more *obscurely* proposeth *it*, the other more *openly*.

Nardius. noct Genial. 4. p. 412.

Epist xxi.

C. Hofman var lect. l. 2. c. 2.

Andr. Vesalius de fabrica corporis humani l. 3. c 7. p. 291. Edit. Venet. 1568.

Jo Ant. Vander Linden de circuit. sangu. exerc. 9

—" *Adeo ut mihi etiam persuasum sit quamvis id nunquam* " *viderim; interdum a sinistro cœnæ caudicis latere, ubi jugulum* " *contingit, venam depromi, quæ secundum sinistrum vertebra-* " *rum latus declivis ducta, sinistris costis samos offerat: illa* " *quam sine pari nuncupamus, dextras costas alente. Atque* " *hujusmodi venæ ortum, non tantum a jugulo primum posse fieri,*

 "*sed*

" *ſed paulo infernis, etiam agnus atteſtatur: in quo tale aliquid* " *ſemel obſervavi.*

" Viden' veniſſe in rem, & quaſi in manu jam habuiſſe il-" lud Ariadnæ filum, quod ſecutus penetrare in naturæ La-" byrinthum, majoremque ſibi gloriam comparare potuiſ-" ſet? ſed quo fructu? Audi ſis, & diſce, quam homini, ſci-" entias ſectanti, neceſſarium ſit, etiam in naturalibus eum, " qui ſui juris & muneris fecit, *docere homines ſcientias &* " *artes*, Pſ 94. v.10. Jer. 28. v.26, precari, Revela oculos " meos ut cernam mirabilia in operibus tuis, ex Pſ.119 v.18.

" *Verum*, inquit, *ejuſcemodi non niſi rariſſime occurrentes ve-* " *narum ſeries, anatomes ſtudioſo non aliter expendendas pu-* " *tarim, quam ſi interdum ſextus in manu digitus, aliud ne mon-* " *ſtruoſum ſe ſpectandum offerret. Adeo ut ſiquando in publicis* " *ſectionibus hæc obſervo, ea tanquam non eſſent, tacite præter-* " *eamne artis candidati in omnibus corporibus hæc obſervari ar-* " *bitrentur.*

" Quanto egregius, & propter hoc non unam atque im-" mortalem laudem meritus *Barth. Euſtachius*: qui non ſo-" lum candide exponit, quod vidit; ſed et præmiſſo, quod res " merebatur, præloquio conatus eſt poſteriorem ſtudia ex-" citare ad ulteriorem inquiſitionem et perfectiorem cogni-" tionem. Neque enim ignorabat, *rei quidem inventionem,* " εὐτυχίας munus eſſe: at vero ejus *plenam cognitionem* τῆς " εὐτεχνίας opus eſſe. Sed audiamus ipſum.

" *Ad hanc naturæ providentiam quandam equorum venam a-* " *lias pertinere credidi: quæ cum artificii & admirationis plena* " *ſit, nec delectatione ac fructu careat: quamvis minime ſit ad* " *Thoracem alendum inſtituta: operæ pretium eſt ut exponetur.* " Itaq; *in illis animantibus*, pergit *ab hoc ipſo inſigni trunco ſini-* " *ſtri juguli, qua poſterior ſedes radicis venæ internæ jugularis* " *ſpectat, magna quædam propago germinat: quæ præterquam* " *quod in ejus origine oſtiolum ſemi-circulare habet, eſt etiam* " *ALBA ET AQUEI HUMORIS PLENA; nec longe ab* " *ortu in duas partes ſcinditur; paulo poſt rurſus coeuntes in u-* " *nam: quæ nullos ramos diffundens, juxta ſiniſtrum vertebra-* " *rum latus, penetrato ſepto tranſverſo, deorſum ad medium uſq;* " *lumborum fertur: quo latior efferta, magnamq; arteriam cir-* " *cumplexa, obſcuriſſimum finem, nihilq; adhuc non bene perce-* " *ptum, obtinet.*

Since

Since the writing hereof, I have met with a book containing certain Letters of *Marcellus Malpighius*, and *Carolus Fracaſſatus*; in which it is obſervable that *Fracaſſatus* (the *Anatomy*-Profeſſour at *Piſa*) doth aſcribe the *Invention* of the *Circulation of the blood* to *Gaſalpinus*; and of the *ductus Thoracius* to *Euſtachius*: His words are theſe: "*Adeo oſcitantia Autorum quædam tam male præponuntur, ac tanguntur, ut oporteat alios eadem repetere, ac ditare novis elucubrationibus, ac ſi nunquam fuiſſent.* Sanguinis Circulatio, Galaxia in Microcoſmo humano, *ſcilicet via Chyli Cor, nonne* Gæſalpinum *agnoſcit Authorem, ac* Euſtachium de vena ſine pari? *Et tamen ſoles in* Scholis *Autores crepant Anglos* Harvæus, & *Diopenſes* Pecquetos: *non tamen ſpernendi, qui verum rudimenta ponunt, etiamſi infecto nec abſoluto opere ceſſaverint: qui invenit anticipavit laborem & curam quærendi: & ad minora vocatur, ſi quæſtionis ſolicitudo & jactatio tollatur: par tamen decus manet & illum, qui primum invenit, & qui poſtremum perfecit, neſcio enim an præſtet inveniſſe, an ditaſſe.* *Fracaſſatus de cerebro. p. 202.*

Having ſaid thus much, I leave Mr. *Glanvill*, to anſwer thoſe little *quillets* of his, which can convince none but *Shallow-brain'd* and *Comical Wits*. ——"If *they knew theſe* grand "Theories formerly; how chanceth it that they ſpeak no "more of things, which no doubt they had frequent occaſi-"ons to mention? How come they to be *left* without memory "among their followers, who were ſuch *ſuperſtitious porers* "upon their writings? How chanceth it not to have been "ſhewn to be lodged in thoſe Authors before the days of Dr. "*Harvey*, &c. when Envy had impregnated and determined "their *imaginations*? Let *illiterate perſons* and Mathema-"ticians be ſwayed againſt *plain proof* by theſe Arguments. I think in ſtead of *Temples* and *Altars* to be erected to *theſe Inventors*, there is more need of a *Schoolmaſter* and an *Antiquary*, the one to teach *them humane learning*, the other to inſtruct them in *paſt diſcoveries*; leaſt, with much trouble and pains our new Philoſophers ſhould *finde out* again the *Art* of *Printing*, or *Etching*: the uſe of *Gunpowder*, or the *Load-ſtone*.

Of

Of Transfusion of Blood-- into Animals.

Plus Ultra. pag. 17.

" THus, Sir, *I have done with Instances of* Anatomical " Advancements, *unless I should hitherto referre the* " *late noble* Experiment of *Transfusion of the Blood,* " *from one living* Animal *into* another, *which I think very fit to* " *be mentioned*; *and I suppose it is not improper for this place*: " *Or however, I shall rather venture the danger of* impropriety " *and* misplacing, *then omit the taking notice of so* excellent " *a* Discovery, *which no doubt future* Ingenuity *and* Practice " *will improve to Purposes not yet thought of*; *and we have very* " great likelihood *of advantages from it in* present Pro- " spect.

" *For it is concluded, That the greatest part of our* diseases, " *arise either from the* scarcity, *or* malignant tempers *and* " corruptions *of our* Blood; *in which cases* Transfusion *is an* " obvious Remedy; *and in the way of this Operation the* pec- " cant blood *may be drawn out, without the danger of too much* " enfeebling *Nature, which is the grand inconvenience of* meer " Phlebotomies. *So that* this Experiment *may be of* excel- " lent use, *when Custom and Acquaintance have* hardned *men* " *to permit the Practice in* Pleurisies, Cancers, Leprosies, " Madness, Ulcers, Small-Pox, Dotage, *and* all such like " Distempers. *And I know not why that of* injecting prepared " Medicines *immediately into the blood, may not be better and* " *more efficacious then the ordinary course of Practice*: *Since* " *this will prevent all the danger of frustration from the* loath- " ings *of the* Stomach, *and the disabling, clogging mixtures* " *and alterations they meet with* there, *and in the intestines, in* " *which no doubt much of the* spirit *and* virtue *is* lost. *But in* " *the way of* immediate injection *they are kept intire, all those* " *inconveniences are avoided, and the Operation is like to* " *be more speedy and successful. Both these* noble Experi- " ments *are the* late Inventions of the *ROYAL SOCIETY,*

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" *who have atteſted the* reality *of the former, that of Transfuſion*
" *of* Blood *by numerous trials on ſeveral ſorts of* brute Ani-
" mals, *Indeed the* French *made the* Experiment firſt *upon*
" humane Bodies, *of which we have a good account from Moun-*
" *ſieur* Dennis. *But it hath been practiſed alſo with fair*
" *and encouraging ſucceſs by our* Philoſophical Society. *The*
" other *of* injection, *if it may be mentioned as a* different in-
" vention, *was alſo the Product of ſome* generous Inventors;
" *though indeed more* forward Forreigners *have endeavoured*
" *to* uſurp *the* Credit *of* both *This latter likewiſe hath ſuc-*
" *ceeded to conſiderable good effects in ſome* new *Trials that*
" *have been made of it in* Dantzick, *as appears in a Letter*
" *written from Dr.* Fabricius *of that City, and Printed in the*
" Philoſophical Tranſlations.

I ſhall not quarrel with Mr. *Glanvill* for miſplacing this diſcourſe about the *Transfuſion of Blood*, but I think all the World will condemn him for aſcribing either the invention of *Transfuſing blood*, or of *injecting Medicaments into the veins*, unto the *Society*. That the latter was a thing much practiſed by Dr. *Wren* and others in *Oxford*, before the Reſtoration of his Majeſty, and before that ever the *SOCIETY* was thought upon, is a thing known to all that were at thoſe days in that *Univerſity*. I ſaw my ſelf in thoſe days the Dog into whoſe *veins* there was *injected* a Solution of *Opium*, at the Lodgings of the Honourable *Robert Boyle*, of which he makes mention in his ſecond diſcourſe of the *Uſefulneſs of Natural Philoſophy*, and *Borrichius* in his Letters to *Bartholinus*.

Thoſe Forreigners will rectifie hereafter their miſtakes, and not attribute the *injecting of Medicaments* to their invention: as *Caſpar Schottus* in Mirab. Art. l. xi. c. 21. p. 891. & *Phil. Jac. Sachs* in Ocean Micro-microcoſm. ſect. 155 have done, unjuſtly magnifying *Solertiſſimam Induſtriam & Experientiam* of theſe Pretenders *Andr. Libav.* defenſ. Syntagm arcanor. adv. *Henning Scheunemem* act 2. c. pag. 8. edit. Francofourt. An. 1615.

As for that other of *Transfuſing the blood out of one Animal into another*, if the Queſtion be *who firſt propoſed it into the World to be tried*, it is certain that *Libavius* firſt did that, at leaſt I know not any more ancient then *He*. That Learned man above *Fifty* years ago, ſo plainly deſcribes the Transfuſion, that one can hardly diſcourſe of it with more *clearneſs*, then *there* is done in theſe words. *Adſit Juvenis robuſtus, ſanus, ſanguine ſpirituoſo plenus: Adſtet exhauſtus viribus, tenuis, macilentus, vix animam trahens. Magiſter Artis habeat tubulos argenteos inter ſe congruentes, aperiat arteriam robuſti & tubulum*

tubulum inſerat, muniatque mox & ægroti arteriam findat, & tubulum fœmineum infigat: jam duos tubulos ſibi mutuo applicet, & ex ſano ſanguis arterialis calens & ſpirituoſus ſaliet in ægrotum, unaque vitæ fontem afferet, omnemque languorem pellet. This allegation was made uſe of by an *Italian Philoſopher*, and ſilenceth all thoſe in *England*, or *France*, that pretend to the *Glory* of having firſt *propoſed*: So that the Author of the *Philoſophical Tranſactions* confeſſeth it in theſe words". This indeed is clear enough, and obligeth *us* to averre a greater *Antiquity* of *this operation*, then before we were aware of, though 'tis true, *Libavius* did not *propoſe* it, but only to mock at it (which is the common fate of *new Inventions* in their Cradle) beſides that, He contrives it with great danger both to the *Recipient* and *Emittent*, by propoſing to open *Arteries* in both, which indeed may be practiſed upon *Brutes*, but ought by no means upon *Man*. Till that learned *Italian* had inſtructed the *Virtuoſi* in the point, there had been a great Controverſie agitated between the *French* and *Engliſh Societies* about the *Invention*. The former pretended, that it was *mentioned* firſt amongſt *them* about *eleven years* ago, at the Aſſembly, in the houſe of *Mounſieur de Montmor*, and that the publick is beholding to that *Monſieur* for this *diſcovery*, and the *benefits* and advantages that ſhall be reaped *thereby*. But about the perſon that ſhould *firſt* mention the deſign, the *French* vary. *Monſieur de Gury* fathers it upon the Abbot *Bourdelot*: but the Author of their *Journals* upon a *Benedictine* Friar. Our *Society* having given the world occaſion to take notice of *it publikely*, and having otherwiſe long before purſued the *Oxford-Invention* of *injecting Liquors into the veins*, thought *themſelves* injured in this, that the *French* ſhould uſurp the *Credit* of ſuch a *diſcovery* as had its firſt *birth* in *England*, upon a pretence that it was *conceived* in *France*: it being notorious, the *French* took *occaſion* to try it by the *Example* of the *Engliſh Virtuoſi*: and there being no *publick record* cited, declaring the time and place of the *Invention propoſed* the Method to *practiſe* it, and the ſucceſs of the *Execution*, Thereupon began a *Paper-ſcuffle* betwixt the *Gazettiers* o-

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Philoſ. Tranſact. Numb. 37. p. 740.

By his leave it infers only the *mention* of it to be more *ancient*, not the *Operation*.

Libavius propoſeth it out of ſome *Paracelſian* Magical *Writer*, and not from his *own Fancy*: adding that the *Phyſician* who practiſeth *Tranſfuſion*, deſerves *Hellebore* himſelf.

See Mr. *J. Denny*'s Letter in the Tranſact. numb. 27. & numb. 28.

the *Curienſe* which any man may reade with ſome *pleaſure*, becauſe they had on both ſides ſuch little *Logick*, as to argue from the *mentioning of a deſign*, to the *effecting it*. If the way of *Argumentation* be *good* and *ſolid*, then *Ariſtotle*, and ſuch of the *Ancients*, as *propoſed* the *ſquaring of the Circle*, muſt not be denied the glory of being *Inventors of it*: So they which firſt propoſed a *perpetual motion*, or the *North-weſt Paſſage*, may go for *Inventors of them*: yet are none of *theſe* things yet diſcovered. Oh! new *Correlates*, and worthy of *our Inventors*! Long ago *Ariſtotle* and the Common *Dialecticks* told us, *Datur ſcibile de quo non datur Scientia*. But none like our *Anti-Logicians*-ever taught, there were a ſort of *Inventors* whoſe *Inventions* were yet to *ſeek*. All that our *Inventors* did, was, that after Dr. *Lower* had firſt *diſcovered* and *practiſed* the *Transfuſion* at *Oxford* in *February* 1665. They on the *ſeventeenth of May* following 1665. gave order that there ſhould be *trials* made for *tranſfuſing* the blood: but *their trials proving lame for want of a fit Apparatus*, and a well continued Method of *Operation*: the *Dr.* ſent them a *convenient Method* for effecting the thing. Before *this*, there never was any *mention* or *propoſal* made at the *Society* concerning the *Transfuſion*, as I am certainly informed by one of *their Number*, who hath examined their *Journal-Books*, in which ſuch *Propoſals* and *Experiments* are recorded. Nay, they were ſo far from pretending to it at firſt, that when it was mentioned unto them by Mr. *Boyle*, there were ſome as well *ſevere* as *ingenuous* Critick's, who thought it ſomewhat *ſtrange* and *bold* for him to affirm that the *Dr.* had made it ſucceed. And beſides, I obſerve that Mr. *Boyle* in his Letter to Dr. *Lower* (who hath vindicated the *Invention* to himſelf in his late Book *de Corde*) doth not ſay that ever the *Society* had *thought* of or *attempted*, or *deſigned to attempt* the thing. He calls it *inſolitum & inſperatum conamen*. June 26. 1666. and deſires *He* would acquaint the Society with the manner how he atchieved it. Now ſince that neither was Dr. *Lower* then of the *Society*, nor *any way* entitles *them* unto *it*, but *himſelf*, and that in a Treatiſe wherein he doth not ſo much as call *him-*

See Tranſact. Num. 28. pag. 514.

In the Transactions *numb.* 37. *pag.*371. *The* Gazettier *affirms, that upon further investigation it was by* good proof *(which is in his hands) proved, that the* invention *had been known to some* Ingenious *persons in* England *thirty years ago. If so, then is not the* Society *the* Inventors *of it, except we will say, that* Societies *as well as* individual *souls do* pre-exist *? But may not a man ask our* Gazettier, *where is the* publike record *of this* Invention *? what Account is there of the* Method *with which it was practised ? with what success ? How comes all this to be concealed till after* Dr. Lower *atchieves it, and the* French *pretend to it ? would any man have concealed their claim to the* Discovery, *after that it was become the talk of* Europe, *the Darling of the* Society, *and worthy to be disputed for by the* French *? why did they not put in their Claim,* being within hearing, *till about* three years *after,*

self a *Member of that Assembly*, set any man judge with how much truth this other *Discovery* is ascribed to these *NEW EXPERIMENTATORS*, by our *Virtuoso*. But least I should seem to deal too *severely* and *malignly* with them, rather then it shall be said *That they invented nothing*, I grant, that *They* invented a *LYE*; and shall conclude the Debate by representing the words out of *their Transactions*, by which they assume to *themselves* the *Credit* of the *Invention*, and by a *dubious wording* and *pointing* of the *Period*, insinuate as if Dr. *Lower* as well as Dr. *King* had been encouraged to the *Attempt* by the *Society*.

*Philosoph. Transact. Numb.*27. *pag.*490.

" *How long soever that Experiment may have been conceived*
" *in other parts (which is needless to contest) it is notorious that*
" *it had its* Birth *first of all in* England; *some ingenious per-*
" *sons of the* Royal Society, *having first* started it there, *se-*
" *veral years ago, (as appears by* their Journal) *and that dex-*
" *trous* Anatomist, Dr. Lower, *reduced it into practice, both*
" *by contriving a Method for the* Operation, *and by success-*
" *fully* executing *the same, wherein* he *was soon overtaken by*
" *several happy Trials of the skilful hand of Dr.* Edmund King,
" *and others encouraged thereunto, by the said* Society, *which*
" *being notified to the World Numb.* 6.19. & 20. *of these Transf-*
" *actions printed* Novemb. 19. & Decemb. 17.1666. *the* Ex-
" periment *was soon after that time heard of to have been tried*
" *in forreign Parts, without hearing any thing of its having*
" *been conceived* ten years ago.

In which relation, I must take notice that it doth not *really* appear in their *Journal-books*, that ever any such thing was started by any persons *how ingenious soever* of *their Society*; Dr. *Lower* being not *then*, nor *long after* in the *History of the Royal Society* reckoned as a *Member* of it. Next-

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that the *interpunction* of the period is ſo *equivocally* placed and penned, that the *unwary Reader* may think that Dr. *Lower*, as well as the *others* was encouraged to the *trial* by the *Society*. Whereas *he* was not, whatever the *others* were. Again, it is *diſingeniouſly* ſaid, that *he* was ſoon overtaken by *ſeveral happy Trials* of Dr. *Edmund King*, and others, encouraged thereto by the *Society*. Since it appears by the letter of Mr. *Boyle*, that the *Society* knew not how to do the thing in *June*, which Dr. *Lower* had effected in *February*, and the fame thereof at that time was ſpread over *England*. In *July* Dr. *Lower* acquainted the *Society* with the *manner of the Transfuſion*, whereof Dr. *Wallis* had given the *Society* an imperfect account a little before of what he had ſeen Dr. *Lower* do at *Oxford*. So that for at leaſt *four* or *five months*, the *Members* of the *Society* did not overtake Dr. *Lower*. But after *they were acquainted with the contrivance*, they invented *it very clearly*.

From *hence* it is eaſie for any man to judge with how much *right* Mr. *Glanvill* doth ſay, that both the *injecting of Medicines, and transfuſing blood into the veins of Animals*, thoſe *Noble Experiments* were the *late Inventions of the* SOCIETY. I ſhall now proceed to inquire into the *Utility of them*; thereby to diſcover how *noble* and *excellent* they are, and what *advantages* we may hope to derive from them hereafter.

Becauſe this *Transfunding of blood* hath hitherto been looked on as the *primary Invention*, and the moſt *famed* of any the *Society* were ever *intitled* unto: and that they *themſelves* have particularly concerned themſelves in aſſerting it to be their *diſcovery*, to the end that every *Reader* may the better be able to judge of the *Controverſie*, without being forced to go ſeek out amongſt the ſcattered *tranſactions* and elſewhere, ſeveral *Hiſtories* that are material to the paſſing a right judgement; I ſhall crave pardon if I do relate particularly the matter of *fact*, and what hath been ſundry times performed by the *Engliſh*, *Italian* and *French Virtuoſi*, with every circumſtance, both as to injecting of *Medicines*, and of blood into the veins.

As to the *injecting of Medicaments into the veins*, it is an *Experiment* that I am apt to think was first tried by the *English*, and as a *curiosity*, it was not *unpleasant*; but that it should be so advantageous a discovery as Mr. *Glanvill* represents it is like to be, I do not beleeve. There was a time when men had regard to their *Consciences*, and what could not be administred but upon *prudential hopes* of advantage to the *Patient*, no approved *Physician* durst, or would give to any sick person: but in this *Age, such as ought to protest against it*, are as forward as any to forget *these considerations*, and prompt men on to practices without either regarding whether the effect be not *Murther* in the *Physicians*, besides the ill consequences to the *diseased*. In the *injecting of Medicaments*, I must complain that neither the *Operation of Medicaments immediately injected into the blood and veins* is *known*, nor the *dose*; and consequently the *Project* not like to improve *Physick* at all, *unless* our *Magistrates* will *licence men* to try so many *Experiments*, even to the *apparent hazard* or certain death of the *parties*, and may regulate and authenticate the practice in such manner as becomes a *Baconical* Experiment: and to encourage Rational men to this procedure, there ought to be a greater *deficiency* in *Physick*, then yet appears, and a more *hopeful success* then any man can yet expect, supposed by this way. A *Paynim* told us,

Nulla unquam de morte hominis cunctatio longa est.

A sober *Physician* will look upon the act to be as indiscreet, as the *Comedian* describes *love* to be, *Quæres in se neque consilium, neque modum habet ullum, eam consilio regere non potes.* That there is no *probability* that this way of *Medicine* can ever amount to any thing, appears from this consideration, that *Liquors immediately injected into the blood*, have a different *Operation there*, then when taken in by the *Stomach*: and that the *mixtures of Liquors* with *blood* upon *Phlebotomy* in a Pottinger, gives no light to the *Experiment*. As I shall now shew.

Seignior Fracassati Professor of Anatomy at *Pisa* tried these

theſe Experiments *by injecting Medicaments.*

1. Having injected into the *jugular* and *crural* veins of a *Dog* ſome *Aqua fortis* diluted, the Animal died preſently: and being opened, all the *blood* in the *veſſels* was *coagulated* and *fixed*: but that which was in the *Viſcera* (which I dare not Engliſh *Guts*, but take it to denote the *Heart*, *Liver*, *Lungs*, *Spleen*, where the blood paſſes *extravaſated* through: though the *Tranſactions* render it *Guts*, and deſtroy the antitheſis betwixt *vaſa* and *viſcera*) did not ſo eaſily *coagulate*. It was alſo obſerved that the *great veſſels* were *burſt*, or as it were *cut* aſunder, yet have I known who hath put *Aqua fortis* into *cooling Juleps* in Fevers, as others do *ſpirit of Vitriol* without any *harm*. *Tranſact. num.* 27. *p.* 490 491.

2. There was alſo *infuſed* into another *Dog*, ſome *ſpirit of Vitriol*, which had not ſo preſent an effect: for the *Animal* complained a great while, and foamed like *Epilepticks*, and had its reſpiration very thick: and obſerving the beating of his breaſt, one might eaſily judge, the *Dog* ſuffered much: who dying at laſt, his *blood* was found fixed in the *veins*, and *grumous*, reſembling *Soot*: whereas in the Experiment with *Aqua fortis* (which may as eaſily be given inwardly as ſpirit of *Nitre*) the blood is not ſaid to have been changed in its *colour* from other *coagulated blood*. It was alſo obſervable (though the Tranſactions minde it not) that the *blood* in this laſt *Dog* was not upon *coagulation* continuous in *the veins*, but *broken* and ſevered into *parcels*. Car. Fracaſſ. *Ep. Anat. de cerebro. p.* 252. 253. 54.

3. There was alſo injected into the *jugular* of another *dog*, ſome *oyle of Sulphur per campanam*, but he died not of *it*, though this *infuſion* was ſeveral times tried on *him*. And the wound being cloſed, and the *dog* let go, he went into all the corners of the room, ſearching for meat, and having found ſome bones, he fell to gnawing them with a ſtrange avidity, as if *this Liquor* had cauſed in him a great appetite.

4. Another *dog*, into whoſe veins ſome *Oyle of Tartar per deliquium* was injected, did not eſcape ſo well: for he complained much, and was altogether ſwoln; and then died: Being opened, the *Spectators* were ſurpriſed to finde his

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2. There was also *infused* into another *Dog*, some *spirit of Vitriol*, which had not so present an effect: for the *Animal* complained a great while, and foamed like *Epilepticks*, and had its respiration very thick: and observing the beating of his breast, one might easily judge, the *Dog* suffered much: who dying at last, his *blood* was found fixed in the *veins*, and *grumous*, resembling *Soot*: whereas in the Experiment with *Aqua fortis* (which may as easily be given inwardly as spirit of *Nitre*) the blood is not said to have been changed in its *colour* from other *coagulated blood*. It was also observable (though the Transactions minde it not) that the *blood* in this last *Dog* was not upon *coagulation* continuous in *the veins*, but *broken* and severed into *parcels*.

3. There was also injected into the *jugular* of another *dog*, some *oyle of Sulphur per campanam*, but he died not of *it*, though this *infusion* was several times tried on *him*. And the wound being closed, and the *dog* let go, he went into all the corners of the room, searching for meat, and having found some bones, he fell to gnawing them with a strange avidity, as if *this Liquor* had caused in him a great appetite.

4. Another *dog*, into whose veins some *Oyle of Tartar per deliquium* was injected, did not escape so well: for he complained much, and was altogether swoln; and then died: Being opened, the *Spectators* were surprised to finde his

blood

blood not *curdled*, but on the contrary more *thin* and *florid* then ordinary.

Dr. *Lower* de motu Cordis pag. 19.

5. Dr. *Lower* having extracted half a pound of blood out of the *crural urine* of a *Maſtiff dog*, did inject the like quantity of warm *milk* into him; within half an hour the *dog* became very *ſick*, breathed with difficulty, and ſeemed to labour much with his *heart* and *diaphragme*, and after to palpitate, tremble and ſigh grievouſly, and at length miſerably died. Upon diſſection he found the *vena cava*, the ventricles of the *heart*, the veſſels of the *Lungs*, and the *Aorta full of blood* and milk *coagulated* together, and the *concretion* was ſo hard, that it was not eaſie to part it. This he tried but once. But *Monſieur Dennys* the *French* Phyſician ſaith, he tried it with a different ſucceſs. For having ſyringed about a quarter of a pint of *milk* into the *veins* of an *Animal* (he tells not *what*) and having opened the ſame ſome time after, he found the *milk* ſo perfectly mixed with the blood, that there was not any place in which appeared the leaſt footſtep of the *whiteneſs* of the *milk*, and all the blood was generally more *liquid*, and leſs apt to *coagulate*.

Tranſact. num. 27. pag. 49,.

6. I received an account of ſome Experiments, from one much verſed in theſe *injections* (which he may one day acquaint the world with) to this effect. That the infuſion of *Crocus Metallorum*, injected in a leſs quantity then otherwiſe (*viz*, ℥ β) will work by vomit in a *dog*, almoſt preſently, and very ſtrangely, and make him grievouſly ſick. Yet Dr. *Wren* informs Mr. *Boyle*, that a moderate doſe of the infuſion of *Crocus Metallorum* did not much move the *dog* that he injected it into: but a large doſe of *two ounces* or more wrought *ſoon*, and ſo *violently*, that he *vomited up life* and all. That a *dog* will take two drams of *Opium* into his *Stomack*, and ſeem never the worſe, if you keep him from lying down *half an hour after*; but *two drams* of *Poppy-ſeeds* made into an *Emulſion*, and injected into his *veins*, will kill him *preſently*.

Mr. *Boyle* of the Uſefulneſs of Nat. Philoſ. part. 2. p. 54, 55.

Vid. ſupra p. 53, 54

7. Mr. *Boyle* ſaith, that he conveyed a ſmall doſe of the *tincture of Opium* into a *dog* this way, which began to *work* ſo *ſpeedily* upon the *brain*, that he was ſcarce untied before the

the *Opium* began to diſcloſe its *Narcotick* quality; and almoſt as ſoon as he was upon his feet, he began to *nod with his head*, and reel and faulter in his place; but being kept *awake*, and in motion, by whipping up and down the Garden, after ſome time he came to himſelf again, and not only recovered but began to grow fat ſo manifeſtly, that 'twas admired.

8. A certain *German* Count coming into *England*, relates an Experiment, which he ſaw in the preſence of Pr. *Rupert*. After ſome *blood* taken from a *dog*, there was injected into him a ſmall quantity (*portiuncula*) of *Spaniſh* wine; within ſometime after the *dog* was perfectly *drunk*, being giddy, performing ſundry ridiculous actions, then *vomiting* with a profound ſleep. *Phil. Jac. Sachs* in Ocean. macro-microcoſm. ſect 155.

9 Dr. *Fabricius* Phyſician to the City of *Dantzick* injected purgatives into *humane bodies*, with this effect. A ſtrong bodied *Souldier* being dangerouſly infected with the *Pox*, and having grievous protuberations of the bones in his armes, *two drams of a purgative liquor* were injected: he preſently complained of great pains in his *elbows*, and the little *valves* of his arm did ſwell ſo viſibly, that it was neceſſary by a *great compreſſion* on's fingers to ſtroke up that ſwelling towards the Patients ſhoulders. Some four hours after it began to work, not very troubleſomely; and ſo it did the next day, in ſo much that the man had five good ſtools with it. Without any other remedies thoſe protuberances were gone, nor are there any footſteps of the diſeaſe left. Two other trials were made upon women, the one a *married woman* of 35, the other a *Servant-maid* of 20 years old: both from the birth had been grievouſly troubled with *Epileptick* Fits, ſo that there was little hopes of curing *them*. There was injected into *their veins* a *laxative roſin*, diſſolved in an *Antiepileptical ſpirit*; the *firſt* of theſe had gentle ſtools, ſome hours after the *injection*; and the next day the *Fits* recurred now and then, but much milder; and are ſince quite vaniſhed. The *Maid*, ſhe went the ſame day to ſtool four times, and ſeveral times the next: but by going into the Air, and taking cold, and not obſerving any diet, caſt her ſelf away. 'Tis remarkable, that it was common *to all three*, to vomit ſoon after the *injection*, and that *extreamly*, and *frequently*. Tranſact. numb. 30. pag. 564, 565.

I have

I have not time to adde any more of theſe kind of *trials*: but from hence it is evident, that things *operate* (where they do operate in the ſame manner) in a leſſer *doſe*, then when taken into the *Stomach*, and with more *violence*. That oftentimes ſuch things as are *innocently* taken in to the *Stomach*, are mortal when *injected immediately into the blood*. That although learned Phyſicians have made *little* or *no difference* betwixt the operation of *Oyle of Sulphur*, and that of *Vitriol*, yet by this *Experiment* there is found to be a quite *different effect*. So the *Salt of Tartar* (which is as innocent as Salt of *Wormwood*, or any *ſuch Salt*) had a pernicious effect upon the *dog*, though *diſcrepant* from the others.

Vulgo hactenus a non paucis ſpiritus Vitrioli, & Sulphuris pro diverſis rebus habiti ſunt: adeo quidem ut nonnulli flores ſulphuris & acidum ad coſtem pulmonis morbes exhiberent: ſed valde imperite cum acida omnia ſint pectori inimica, & ſpiritus Sulphuris & Vitrioli eſſentia nullo modo differant, ſed ex eadem re generentur, & parentur. Etenim ſpiritus Vitrioli & Sulphuris eundem ſaporem, colorem & omnino eaſdem qualitates & effectus habent, & ad eoſdem uſus in medicina adhibentur: nondumque inventus eſt, qui peculiarem aliquam, ſeu manifeſtam ſeu occultam qualitatem in ſpiritu Sulphuris monſtrare potuerit, quæ non etiam in ſpiritu Vitrioli ſit. Sennert. *in Paralipomen. ad inſtitut. l.* 5 *part.* 3 *ſect.* 3 *c.* 5.

As to the *Experiments* of Dr. *Fabritius*, they do not give much of *Encouragement* to the *Trial*, for the one died which had the moſt of *youth*; and though *her* death be attributed to *other circumſtances* and neglects, yet either thoſe are *trivial*, or for ſome (*unknown*) length of time there muſt be *greater care* then *ordinarily* after *Phyſick*, otherwiſe *ſmall accidents* become *mortal*. And the *extreme* and *frequent vomitings* (which here happen from the ſufferings of the *Heart*, and not the Stomack) render the courſe more *hazardous* to *tender Stomachs*, and *weak Conſtitutions*, then Mr. *Glanvill* ſuggeſts. So that the *loathings of the Stomach* are not prevented *by this way*, nor the ſucceſs very *inviting* (how ſpeedy ſoever) upon thoſe *Experiments* any more then from the *Churliſh Phyſick* of the *ancient* and moderate *Chymiſts* of Mr. *Odored*'s party, which *wiſe-men* will not imitate. I wonder the *laxative Solutions* were not ſet down that we might judge of their *ſtrength*: and that the way of dieting and *ordering of them afterwards* was omitted: whereas the knowledge thereof might avail to prevent the *ill conſequence* which befel the *Maid*.

I ſhall now conſider the effects which the *ſeveral Liquors* have

have upon a *mixture* with the *blood*, when taken warm in a *Pottinger*, and thoſe *affuſed* to it. This is a Practice which the Honourable Mr. *Robert Boyle* imparted to the *Royal Society* in *December* 1664. and thinks that *Fracaſſati* may have taken his hint from it, to *inject thoſe Liquors*: but I finde a Letter from *Leyden* ſent to *Bartholinus*, Dated *Jan.* 9. 1662. in which there are ſeveral *Experiments* of that kind, which I ſhall ſet down preſently. If *I* placed any great value upon the *Experiment*, *I* could put in for the Practiſer of it at *Stratford upon Avon* in 1660. and prove that I made ſome *Solutions* of *Salt of Aſh*, *Salt of Wormwood*, and *Salt of Tartar*, and received the blood of *ſheep* into the *glaſſes* in which *they were*, to try the differences betwixt thoſe *Salts*, whether they were of the ſame nature (ſo that it was indifferent whether one uſed Salt of *Wormwood*, *Carduus Benedictus*, *Yarrow*, or *Mugwort*) or that there were *any difference*. Which laſt *Angela Sala* denies, though other *Chymiſts* affirm it. But after that *I* had enquired into that Controverſie by ſeveral ways, *I* went to *Jamaica* and neglected the *Experiment*. But ſince that *I* ſee that every *unprofitable trifle*, becomes a *famous* and *noble Experiment*, and if it bring no preſent *Emolument*, yet at *leaſt* it becomes *Luciferous*, and (as they ſay) puts us in the Proſpect of *ſeveral great advantages*; at leaſt, *more and greater things will be diſcloſed by it, when future ingenuity and diligence hath improved and perfected the invention.* Since that time *I* have made many *Eſſays* about the *mixture* of *ſundry Liquors*, with the blood of *Sheep*, *Lambs*, *Calves*, *Cows*, *Oxen*, *Hogs*, *Poultry*, and that in ſeveral manners.

Angelus Sala Tartaralog. ſect. 3 c. 2. p. 133.

I have received the blood of *ſeveral creatures* upon *warm ſolutions* of *ſundry Salts*, of *Allom*, *impure Salt-peter*, Sal *Prunellæ*, *Salt of Nitre*, upon ſolution of the ſeveral *Vitriols*; upon *Steel-wine*, *Vomitive wine*, *Sack*, *French-wine*, and *Malaga*, upon *ſpirit of wine*, *ſpirit of Cider*, and *ſpirit of the grounds of Beer*; upon *warm Urine*, upon mixtures with *ſpirit of Vitriol*, and *oyl of Sulphur*, and *Juice of Lemons*, and *Oranges*, upon the *rare liquor of Salt-peter*; upon *it*, after *it hath paſſed the Aſhes*, and upon the *Mothers of it*, and many other trials with oyle of *Wormwood*, *Amber*, &c. diſſolved in *ſpirit of wine*.

I have alſo poured upon the *Maſs*, after it hath coagulated ſeveral *acid ſpirits*, before and after the *Serum was ſeparated from it*.

I have alſo taken the ſeparated *Serum*, and affuſed *ſpirit of Vitriol* to ſome; to others *ſpirits of Harts-horn*, and other *ſpirituous waters*, and I have affuſed to thoſe that had a mixture of the *ſpirit of Harts-horn* ſome *acid ſpirits*, and other liquors to ſee the *changes*.

I ſhall not now ſet down the ſeveral *Phænomena*, and obſervations I made, not having leiſure to digeſt them all, nor being willing to diſmember a diſcourſe I intend about the nature of *blood* and *Phlebotomy*, in which I ſhall not only treat of all theſe things, but adde many other obſervations, from the *burning of blood*, and the *Serum*, which any man may do, without *feeling* any thing by *ſympathy*, notwithſtanding the *whimſeys* of *Helmont*, and that great *Virtuoſo* Sir *Kenelme Digby*. I have done it fourty times in *Men*, *Women*, and *Children*, to obſerve thoſe varieties in *blood*, which never entred into the heads of our *Experimentators* Though Dr. *Walter Needham*, my learned *School-fellow*, a Member of the Society, deny that blood will burn, *Carbonibus injectus ſanguis flammam non facile concipit, ſed potius torretur in grumum*. Yet if any one pleaſe but to take a piece of the *coagulated Maſs* of blood, and lay it on a *Fire ſhovell*, and ſo place it in an hot fire, that the *coales arch* round *about it*, but *touch it not*: after he hath obſerved the great variety of its *intumeſcence*, and the *crackling* of *divers ſalts*, as it were *decrepitating*, it will take flame commonly when *dry*, and *burn* with a *great variety* of *Phænomena*: ſome will not *flame* at all, though brought to *ignition*: there will be alſo *variety* in the remaining *Cinis*, as to its *ſaltneſs*. In the like manner ſet the *Serum* to coagulate on the *coals*, and then *burn it*. I have alſo burned the *blood* and *Serum*, after it hath been mixed with *acid liquors*. By *this trial* will appear more then can be imagined as to the differences of the blood of *Animals*, and of *young* and *old Animals*, I will endeavour to finiſh that Tractate, whereln there will be *obſervations* about the colour of *blood*, and *melancholique*, and *pituitous*,

Diſquiſit. de ſeetu. pag. 130.

pituitous, and *crimson* parts; and a certain *pellicle* which generates by the *Air* on the top of most blood, if it stand 24 houres; which sometimes is as firme as those *tunicles* that encompass the *Liver*, or *Kidneys*. Observations upon *that*, and upon the *turning* of the *coagulated Mass*, and its becoming red *again*, though not so *floridly*. Trials upon that in *vessels cover'd*, that it is not from the *air*, in opposition to the *Fracassati*.

I will not mention any thing hereof now, but having imparted some observations to some, and knowing what *plagiaries* some men are, I thought fitting to publish *thus much*, that *they might* not pretend to the *inventions*, each whereof were enough to make one of *them proud*, and fill the *Transactions*. Yet I will say this, That I never had put my self upon these *trials*, but out of *envy* and *indignation* against *them*, and the *Transfusion of blood*, about which they made such ado every where. I shall promise one thing, that Mr. *Boyle* is very much mistaken in, imagining that there is a great difference betwixt the effects of *Medicaments*, when mixed with the warm blood of an Animal *out* of the *veins* and *in them*, as will appear by the mixture of *milk* already specified, and that of the *Salt of Tartar*, which will follow out of the Letter of *Borrichius*.

Experiments *upon the mixture of* Liquors, *with the* warm blood *of* Animals, *taken out by* Phlebotomy.

1. By putting into the *warm blood*, as it came from *Animals*, a little *Aqua fortis*, or *Oyle of Vitriol*, or *spirit of Salt*, (these being the most usual and acid *menstruums*) Mr. *Boyle* observed, that the *blood* not only would presently lose its pure colour, and become of a *dirty* one, but in a trice also be coagulated; whereas some, if fine *urinous spirit*, such as the *spirit of Sal Armoniack*, were mingled with the *warm blood*, it would not only not curdle it, or imbase its colour, but make it look rather *more florid* then before, and both keep it *fluid*, and preserve it from *putrefaction* for a long time. Transact. numb. 29. p. 552.

Tho. Bartholin. cp. Centur. 3 cp. 97. pag. 421, 422

2. The *Learned* and *Inquisitive* Man *Olaus Borrichius*, having cut up a dog alive, made these *observations*. He took five *glasses*, and placed them in order, putting into the one *spirit of vinegar*, into another *oyl of Tartar per deliquium*, into a third a Solution of *Allom*, into a fourth spirit of *Salt Armoniack*, into a fifth *spirit of wine*; into each of the Glasses, he suffered the blood of the *Crural Artery* to run. After some time he come to look upon his *Glasses*, but the next day the *observation* was most perspicuous. That Glass which had the *spirit of vinegar* in it, it was become *black* like to the blood of *Melancholique persons*, with a thick and copious *black sediment*, and that liquor which was on the top, was *blackish*.

Inspeximus post intervallum & plenius postridie omnia: Observavimus *sanguinem*, cui affusus erat *spiritus aceti*, redditum *nigricantem* instar sanguinis Melancholicorum, sedimento crasso, copioso, atro, supernatantem liquorem, pæne etiam *atrum*. Cui affusum *oleum salis tartari*, redditum coloris sic satis *floridi*, sed turbidiorem liquorem. sedimentum nullum, ramenta tantum fibrillarum instar hinc inde conspicua. Cui affusa *solutio aluminis*, redditum instar putidæ & subcineritiæ putrilaginis, omni sanguinis colore prorsus abolito. Cui affusus *spiritus vini*, redditum turbidiorem, quam cui *oleum salis tartari*. Cui *spiritus salis Armoniaci*, redditum omnium elegantissimum, colore floridum, tenuem substantia, infundo sedimentum diaphanum instar Galatinæ ribium.

Where the *Oyl of Tartar* was, the colour was pretty *florid*, but the liquor more *turbid*, no sediment at all, only some *filements*, like little *fibres* floated in it conspicuously, here and there.

Where the *Solution of Allom* was, there all seemed like a *subcineritious* or dirty-coloured putrilage, there being no reliques of the *crimson* colour of blood to be seen.

Where the *spirit of wine* was, there the liquor was more *turbid* then that which had the *Oyl of Tartar* in it.

Where the *spirit of salt Armoniack* was, that was of the most *beautiful colour* of all, being very *florid*, of a thin consistence, with a diaphanous sediment like to the *gelly of currants*.

This observation he also tells *Bartholinus*, that *he* had in like manner made the *preceding* Summer.

Out of *all which* it most evidently appears how *nice* a thing the *blood* is, and how *small mixtures* alter the *colour* and *texture* of it: and what *consequences* may follow upon such alteration of its *consistence*, and *particular texture*, no man knows; but that they may be very *bad* (even where *innocent*, and wholesom *Medicaments* are *affused*) is *evident* out of what *I* have set down.

It

It is alſo as manifeſt, that there are in the bodies of *men* and *women ſolutions* or *liquors* imbued with *ſundry ſalts*, as *aluminous*, *acid*, and *vitriolate*, &c. which when *they* ſhall mix with the *injected blood*, what the *iſſue* may be, *I* leave the Prudent to *conjecture*. Certain it is, that for *theſe conſiderations* ſpecified (reſerving my own Experiments to my ſelf) none but inconſiderate *Quackſalvers* would put a *Patient* upon the *trial* of *injecting of Medicaments*, or *transfuſing of blood*. *It* is a courſe *Nature* (whoſe *Servants* and *Imitators Phyſicians* hitherto *were*) never prompted us unto: Having taken ſo many courſes whereby *blood* might at any time of *need* iſſue out of the *veins* and *arteries* in ſundry parts of the body: But eſpecially provided that nothing might *immediately* come into the veins. Whatever comes into the veins by the *Stomach*, ſuffers a great alteration firſt, and whatſoever is *noxious*, either ſeparates from it there and in the guts, or is *mortified*, or *mitigated* ſo as to be *innocent*, and *agreeable* to the nature of the *veins*. Which particular nature of the *ſanguiferous veſſels*, is that which in the *dead* keeps its own *blood fluid*, and in the *living* contributes ſo much to the *motion* of it, that if you make a *ſtop* and *intercept* the impulſe of the *ſubſequent blood*, yet will the other *continue its courſe*. But what will the effect be of *Heterogeneous* blood? For undoubtedly the nature of the *veins* is agreeable to the *blood*, and communicates its *impurities* and *vertue*, as the *cask* doth to the *wine*. But further, ſince the blood is to paſs through the *poroſities* of the *Liver* and *Lungs*, and capillary *veins* and *arteries*, how will *they* agree with the *new blood*. (it being evident upon mixture of *Liquors*, and upon *burning*, that there is a difference in the *fibroſity* of the *bloods*, and conſiſtence of the ſeveral *Serums*) or how will that *circulate* which reſults from the *mixture*, *I* know not, but certain it is, that the *ill conſequence* is *almoſt*, if not *abſolutely paſt remedy*.

Vide ep. *Walæi* de motu ſangu.

In fine, what is it that is aimed at in this *Tranſfuſion*? is it the *rectifying* the *maſs* of *blood* (ſuppoſe *ſeventeen pound* in a body) with the affuſion of a *few ounces*, or a pound of *Lambs blood*? They

They may as ſoon rectifie as much *vinegar*, or decayed *wine*, with the like proportion of *good wine*? would they amend the *impurities of the veſſels*? there is the ſame difficulty as before. That which they *transfuſe* is not a *Chymical ſpirit*, but an *impure*, and *heterogeneous* mixture, fitted by different *digeſtions* and *ferments* to a *different nouriſhment* of *another Animal*, with *different excrements* reſulting from it. It is in the *Stomach* and *firſt digeſtion* where food is ſo concocted by the *Humane heat*, or *Acidity*, as to turn to a *chyle* adequate to the *nouriſhment of man*, and generating ſuch blood, and ſuch excrements, as are the reſult of ſuch a concoction as is *agreeable to the nature of man*. And ſo it is in all creatures: Thus we ſee, that in *different Animals* different *Excrements* are generated, nor is it to be doubted but that the *concoctive* principle differs as much in a *dog*, or *cat*, as do thoſe *excrements* which differ much from thoſe of *men*, though both eat the ſame meat. *Sicut* acidus ſpiritus *quilibet animam inſeparabiliter in ventre ſuo portat, atque in illud corpus, cui infunditur, dominium ſuſcipit, illudque confeſtim juxta ſui naturam format*: *hinc* ſpiritus ſalis *in* Alcali Tartari *fuſus ſtatim ſibi format corpus ſalinum propriæ naturæ conſentaneum*, & fit ſal: & aceti ſpiritus, vel acetum diſtillatum *in eodem* Alcali tartari *ſibi format corpus adæquatum ſuæ propriæ naturæ*, & fit tartarus vini, & *ſic* de vitriolo, & *reliquis* acidis: *Ita quoque* acidum Stomachi humani, *cum apprehendit panem, vel quicquam alibile, in quod dominari poſſit, illud convertit & commutat in* chylum, & *exinde* in carnem humanam: & *eundem panem* Acidum Stomachi canini *convertit & tranſmutat in* carnem caninam: *uti & de reliquis viventibus quotidie docemur, eo quod natura in omnibus iiſdem inſtrumentis operatur*. If the Caſe be ſuch, and that the blood transfuſed hath received thoſe *impregnations of vitality* which are agreeable to the nature of the *Animal* whence it is *transfuſed*, and is qualified to generate ſuch *nouriſhment*, and ſuch *excrements* as are the conſequences of thoſe *digeſtive characters* (if I may ſo call *them*) and *impreſſions*; How can we imagine that ſuch blood being immediately transfuſed into

Otto Tachenius Hippocr. med. clavis c. 9. p. 201.

our

our veins, without those *previous alimental ſigillations* and *digeſtions*, produce those *effects* which are to be expected in *humane bodies*, and are (though *irrationally*) in *this caſe* wiſhed for.

But perhaps they think to atchieve their deſign, by introducing a new texture in the *vitiated blood*, and *veſſels*, or *fermentation*, whereupon ſhould enſue the amendment. I perceive indeed by *their ſtories* a *new fermentation*, that the *dogs piſs blood* (no *deſirable* or *trivial* accident!) But what a little time is there for the blood to paſs unto the *heart*, and mix with thoſe *other Liquors*, and *aſcending blood*, and ſo to paſs into the *Heart* and *Lungs*? How do they know that the *blood* they transfuſe is *good*? Upon *burning* they ſhall finde a difference in *blood of beaſts*; and a *different taſte* and *coagulation* in the *Serum*. Beſides, that the blood of *young Animals* is generally leſs *balſamical* and *inflammable*, of another *texture* and *colour*, the *Serum* very *ſaline*; and in a word, exceeding different from what is in *men* and *women* of years. And in the *blood* of *men* and *women*, there are often defects not to be perceived but by *coagulating* and burning of the *Serum* and *blood*. I have taken the *Serum* of a *Maid* ſeemingly healthful, only pained at *Stomach*, and *abounding in blood*, it *coagulated* and looked *like tallow*, and would not burn at all, and ſmelt *noiſomely* after coagulation, not before. I have ſeveral *ſtrange inſtances* of this kind. If there be ſuch indiſcernable cauſes of *diſtempers*, and mixtures in blood of perſons that are not *well*, if they neither know what they aim at in transfuſing in, nor what they *transfuſe*, Let Mr. *Glanvill* talk of *great Advantages to be expected*, and let them *try* it for me. Sure I am that the *Tranſactions* report an *Untruth*, in ſaying that *Coga* was ever the *better* for it: I am told his *Arm* was ſtrangely ill after it, and difficultly cured: and if all the *great likelihood of Advantages* from *Transfuſion* that are in their *preſent Proſpect*, ariſe from no *other grounds*, they are very *improbable*. The Parliament of *Paris* have forbid it to be proſecuted but by the allowance of the *Pariſian Faculty of Phyſicians*. A

I had an intention to have ſet down at large all the *Stories* relating to the *Tranſfuſion of blood*, with remarks *upon them*: but I was ſo much preſſ'd to *conclude*, and had ſo little leiſure to diſpatch it in that manner as *that time*, that the Reader muſt be content with this *brief*, but I think *ſubſtantial* reply to all that hath yet been ſaid.

See the Stories in the *Philoſophical* Tranſactions.

Swediſh

Swediſh Baron died upon it: and to argue from the cures of *Madmen*, or from what they ſuffer *without hurt*, is not for a *Phyſician*, but for one that deſerves to be ſent to *Bedlam*: for *mad people* endures a thouſand *ills*, and *ſtrong Phyſick*, ſuch as others *cannot endure*: and if they find any amendment ſometimes by *uncouth means*, it is by *accident*, as it makes them ill, which ſometimes prove their *recovery*.

I remember they ſay that it is not expreſſed, how the *Transfuſion* was practiſed upon the Baron *Bond*, nor after how long time it was repeated, when *he died*. But this is no excuſe for *them*; for *they* have fixed no *rules* or *circumſtances* whereby to regulate the *operation*; thoſe are to be learned by *frequent Experiments*, and it may be, the death of more *Patients*. Next, it is not to be doubted, but that *He* that did it might act as *cautiouſly* as they, for his *own credit*, and the *credit* of the *trial*, and the quality of the *Perſon*. It concerns them to procure an *Authentick* Narration of the thing, and what appeared upon his being embowelled

As for *dogs*, they cannot declare what they ſuffer: but I am in haſte, and refer my Reader to the peruſal of the *Hiſtories* in the *Tranſactions*: in which what I laſt objected, is all confeſſed: and if after all I have ſaid, he find encouragement to try a remedy, that hath ſometimes proved *not unfortunate*, (but is always *raſh*) let *him* do it for *me*.

I am ſatisfied, That the operation carries more of *terror* (and many ſwoon upon bleeding) then a *potion*, or *Galenical Phyſick*; and that the *greateſt part of our diſtempers do not ariſe from the ſcarcity, or malignant tempers, and corruption of our blood*, is as manifeſt as can be; more ariſe from the depraved motion, and *redundancy* of the *blood*, and *ſeroſities* in and *about the brain*, and the *laxity* and *ſtrictneſs* of the *habit* and *pores* of *the body*; and in theſe caſes *Transfuſion* is no *remedy*; much leſs in *malignant diſeaſes*, in which to let blood is *often mortal*, commonly *dangerous*; and it always muſt be antecedent to *Transfuſion*, excepting only the ſcarcity of blood; in which caſe what *ſtrength* is there to *aſſimilate*, or *ferment* with the *new blood*.

As to the *Transfuſion of blood* in *Pleuriſies*, the attempt is very *ridiculous*, conſidering what an *Ebullition* and *Inflammation* of the *blood* there is then in the *Lungs*, whither the *transfuſed blood immediately* flows: what *extravaſated ſeroſities* do afflict *thoſe parts*? how unfit are they for any *ſeaſonable fermentation*? And in the *Small Pox*, how few are they

they in *England* which allow of *Phlebotomy* in that diſeaſe at all? and how *irrational* muſt that *Tranſfuſion* ſeem, which *diſturbs* and diverts *nature* in her *preſent work*? what *hazard* muſt the *Patient* run amidſt a *Fever*, and that violent *commotion of humors* which afflicts his *head*, *back*, *heart* and *lungs* at that time, ſhould he beſides all other accidents fall into *piſſing of blood*, a *ſymptom* ſo dangerous in *that diſeaſe*, and ſo uſual a conſequent of *this Operation*.

Having diſpatched theſe papers thus far: the length of time ſince they were ſent to *London* to be *tranſcribed*, *peruſed*, and ſeveral *inſertions* made, according as my *memory*, amidſt a conſtant employment, ſuggeſted any thing *new* unto me, and the delay of the *Printing* till *Michaelmaſs-Tearm*, gives me an opportunity to relate ſome Obſervations I made at *Bath*, during my ſtay there this *Summer*: As famous as the *Bathes* are, and of as *general* an uſe as *they are* (there being no better *Remedy* in the world for the *Scurvey* then the *Groſs-Bath* regularly purſued, and as it *might be*, I cannot ſay is *commonly* practiſed) yet have not our *Experimental Philoſophers* made any Inquiries into its *nature* and *qualities*: not a man of them ever ſo much as tried the mixing of ſeveral *liquors* and *ſpirits* with the water: as I did, and found no change upon the mixture of *Acid ſpirits*: but the *urinous* and *volatile ſpirits* of *Sal Armoniack* (drawn the *Leiden* way) and *Harts-horn* did change the waters of the Pump in the *Groſs Bath* (which ariſeth from the *hot Bath*) into a *lacteous colour* and *opacity*, inſomuch that it repreſented an *Almond-milk*, and after a time there *precipitated* to the bottom an *inſipid Magiſtery* reſembling *Burnt Harts-horn* finely powdered: the *precipitated* powder was more copious in the affuſion of the ſpirit of *Sal Armoniack*, then that of *ſpirit of Harts-horn*: and the former in that *mixture* loſt its *urinous ſmell*, (and made no *unpleaſant*, but an *unctuous*, *ſoft*, *emulſion-like* drink) which the other retained.

Not a man of them ever tried whether the ſeveral *Bath-water* would coagulate *milk*: which I tried *firſt*, and found that the *Kings-Bath-water* makes *Poſſet* with a *ſoft curd*, and whitiſh *poſſet-drink*, which will not become *clear*: the *Groſs-*

Bath makes an *hard curd*, a *clean* but *whitish-posset*-drink: the *Pump-water* of the *Cross*-*Bath* (which ariseth from the neighbouring *hot* *Bath*) yields an hard curd, a *clear* and *very green posset-drink*; which being drunk by a woman that gave suck bred a great deal of milk (more then *fennel posset-drink*) and made her break *abundance of winde*, which those usually do that drink the *Bath-waters*. And I believe this way of giving the *Bath-waters* might be no *small improvement* of *Physick*, were those courses taken *there*, and that *method* which those that understand the *ancient* and *modern* *Bathes*, and waters that are drunk, might easily pitch upon: but this is above the reading of our *Comical Wits*.

I could find no grounds to believe there was any *sulphur*, or *bitumen* in the *Baths*: but rather some odd *Alcali* mixed with the *vitriol* of *Iron*: I extracted the *Salts* by *evaporation* of two gallons of the *Cross*-*Bath-water*; and having reduced them to three quarts I set it to *shoot*; but there was no appearance of *salt-peter* at all: then I evaporated it to *three-pints*, but still neither *salt-peter*, or any other *salt* appeared: then *I* evaporated it *quite away*; and then *I* had about two ounces of a *dark coloured* salt, which at first resembled *cream of Tartar* somewhat *in taste*; but having lien longer on the tongue, it resembled very much the *Vitriolum e Mortis*, with some more Alcalisate taste: *I* performed the *Operation* both in *Iron* and *Glass vessels* with little difference of the *taste*, or quantity of *salt*: some of the said salt dissolving into a *moisture* in the *air* did eat off the *writing* upon such papers as it fell, and turned the paper *yellow* all over, and rotted it. *I* made a *Lixivium* with the *Cross*-*Bath water*, and evaporated *that*, thinking that if there were any unctuous matter in the water, it might hinder the discovery of the *Nitre* in its *shooting*; but neither could *I* finde any thing of *Nitre* this way: but

Mr. *Ch Hotham*, when I shewed him some of the extracted *Salt*, did conceive it to be a mixture of *common Salt*, and *vitriol* of *Iron*.

When I was there, a *Spring* of the *Cross*-*Bath* being lost, they digg'd for it; I tasted the *Earth*, but could finde nothing *nitrous* in it: opening the *gutter* by which that *Bath* empties it self, we found the passage crusted very thick, with a white *lapideous concretion*, *rough* and *unequal* in the surface, with several *crystals* fixed in it, resembling those of *cream* of *Tartar*: to taste, it was *insipid*, and of substance like to what precipitates with *urinous spirits* in the water: but after it had lien on the tongue a while, some pieces discovered a taste exactly like *cream* of *Tartar*, others an *adstriction* somewhat *vitrioline*. I brought some away, and intend to examine it further.

but ſtill there was a taſte of the *Vitriolum Mortis* in the ſalt: and one Mr *Berenclaw* a Practitioner there aſſured me, that he had known the *Bath-water* drunk, and to have tinged the *Excrements* black, but I cannot avow the truth of that.

I inquired about the truth of what Dr. *Mearn* had writ about the *Stone* he took up, upon *Lands-down*, which being infuſed in *water* produced a reſembling heat and taſte to what is in the Bath: But Dr. *Maplet*, an inquiſitive and learned Phyſician there, who was with Dr. *Mearn* then, and had ſome of the *mineral* ſtone, aſſured me it was a *lime-ſtone*: ſo did Mr. *Chapman* an obſerving *Apothecary* there, who likewiſe ſaw the *Stone*, and taſted the *infuſion*. In fine, where Dr. *Mearn* took up that *Stone*, any man may take up a *thouſand*, they not being caſt out of the *Earth*, but dropped out of the *lime carts* which paſs that way into *Bathe*, the *Kills* being thereabouts.

The ſtones in the bottom of the *Croſs-Bath*, many are of *reddiſh ruſty* colour, others *green*: but concerning the Bathe, *I* may next *Summer*, during my ſtay there, in the midſt of *June* and *July* (if God give me *life* and health) make a further Narrative: I only mention this to prevent the *Virtuoſi* from uſurping upon *my diſcoveries* and *intendments*. Yet to do them ſome *juſtice*, I was told that in ſome of their *Tranſactions*, they have this obſervation about *Bathe*, that *if any perſon that is drunk go in there, the Bath will make him ſober: If any that is in the Bath drink freely there, it will cauſe him to be preſently drunk, with leſs drink by far then if he were out of it.* This report is *worthy* of our *Philoſophers*, and advanceth their *intelligence* above the credit that *Ariſtotle* and his *Hunters* deſerve. The firſt part is *defective*, for it ſhould have been added that the *drunk perſon muſt ſit ſtill, and ſweat ſoundly: if he ſtir up and down or ſwim*, he ſhall be *more ſick* then if he had never come in. The ſecond part is *notoriouſly falſe*, and all the *Bath-Guides* and others that have tried it avow, that 'tis uſual for the Townſmen to ſit ſome hours and drink in the *Parlour* of the *Queens-Bath*, and never be drunk: and they ſay, a man that *ſweats there* ſhall *bear much more drink*, then if he were out of the *Bath*: which I thought *rational* and agreeable to what I had obſerv'd in the *Indies*, where men *ſweat* and have more drink then in *England*, and *ſtronger*.

But I come now to that Caſe, for which I adde this *Diſcourſe*, and that is, *Obſervations* upon the mixture of the *Bath-water* and other *Liquors* with *blood*, and the *Phænomena* thereupon, which, though I might reſerve for that other diſcourſe of mine about *Phlebotomy*, yet I will oblige my *Reader* with ſome of thoſe *Curioſities* here, eſpecially ſince it will give him occaſion to reflect how facile it is to multiply *ſuch Experiments*, and how negligent *they* are who pretend to be the grand *Obſervators of this Age*.

When I went to make uſe of the *Bath*, amongſt other *Preparatives* thereto (which are better taken upon the *place*, then at a *diſtance*) I cauſed my ſelf to be let *blood*, and being willing *to improve that occaſion* as well for my *inſtruction*, as *health*, I cauſed ſeveral *Venice-Glaſſes* to be filled with *ſeveral liquors*, each liquor amounting to ſome *three ounces*, and into each glaſs I ſuffered to run as much as half an ounce of blood, or *little more*; taking no other meaſure, then that the whole liquor ſeemed of a deep *blood red*. The *Phænomena* thereupon were theſe enſuing, being obſerved preſently after I had bound up my arm, and was in condition to write.

1. That *Glaſs* which contained the ſpirit of *Sal Armoniack* (drawn the *Leiden*-way) kept of an *equal conſiſtence* from top to bottom, being of a deep red, and not *tranſparent*, like *Tent-wine*.

2. Into two ſeveral Glaſſes I had diſſolved the *Salts* of *Aſh* and *Wormwood*, half a dram in three ounces of water; the ſolutions of theſe *two Salts* ſhewed no difference at all; the top, after ſome ſpace, was of a *florid red*, (ſuch as is viſible in *watriſh* blood) for about a quarter of an inch: the bottom was of a more dark red, and reſembled *Tent-wine*.

3. A foutth Glaſs held *Oleum Tartari per deliquium*: the *blood* and that *liquor* did not firſt mix, but were as *two diſtinct liquors*, notwithſtanding that the *blood* had ſtreamed into the *Glaſs*: After a while the *blood* and *oyle* mixed together, and it all became of a deep red from top to bottom; the ſurface only was *tranſparent*, and of a *brighter red*, as that of the other *Alcaliſate Liquors*, but not ſo far downwards: the reſt was as *Tent-wine*.

4. I

4. I diſſolved half a dram of *Allom* in three ounces of water, and upon bleeding thereupon, all the *crimſon of the blood* was immediately deſtroyed, and it became almoſt *as black as Ink*: after a little ſpace towards the ſurface it cleared up: there were certain *bubbles* on the top that continued the *redneſs*.

5. Another Glaſs held a quantity of the *Kings-Bath water*, the blood that did ſtream into it, appeared of a dark red, but tranſparent, as deep *Bourdeaux* wine ſhews: a little below the ſurface it was *deeply red*, not tranſparent, but like *Tent wine*.

6. The *Croſs-Bath* altered little from the *Kings-Bath*, ſaving that the *tranſparency* of the *ſurface* extended it ſelf downwards to a greater profundity then the other.

7. A Solution of half a dram of *Sal prunellæ*, yielded a *blood* on the ſurface like to that of *Salt* of *Wormwood*, but not to ſo deep a deſcent: otherwiſe it was of the colour and conſiſtence of *Tent wine*.

After they had ſtood in the window about five houres, I returned and obſerved theſe *Phænomena*.

1. That with the *ſpirit of Sal Armoniack* continued like *Tent-wine*, only the uppermoſt part of it to the thickneſs of a *barley-corn*, was *diaphanous* as deep *Bourdeaux*-wine.

2. That with the *Sal prunellæ* coagulated into a *Maſs*, ſhrunk from the ſides of the *Glaſs*, and ſunk to the *bottom*, leaving them ſuper-natant water of a *pale citrine* colour; the *Maſs* it ſelf being of a *florid red* on the ſurface, and of a *deep red*, not *blackiſh*, to the bottom, that I could perceive.

3. That with the *Croſs-Bath water* changed not, but ſeemed thick as *Tent-wine*, the upper part being diaphanous, and like deep *Bourdeaux*-wine?

4. That with the *Kings-Bath water* changed not; only the *diaphanous ſurface* extended not it ſelf downwards ſo far as the other Bath-water did.

5. The *Solution of Allom* continued all fluid and black; no *coagulated maſs* therein: but the *bubbles* had loſt their

their *crimſon-colour*, and were become *cineritious*,

6. That with the *Salt of Wormwood* reſembled deep *Bourdeaux* wine, but was leſs *diaphanous* a little below the ſurface: The *ſurface* extended downwards to the length of a *barley corn* with a perfect *tranſparency*.

7. That wherein was the *Sal fraxini* was *diaphanous* to the bottom; no innatant *filaments* or *coagulated* maſs in it: But the ſurface to the length of a barley-corn was like decayed *Claret* made with a mixture of white and red wine: the reſidue was deeper like that of *Bourdeaux*.

8. That with the *oleum Tartari per deliquium* was *diaphanous* to the length of a *barley-corn*, and of the colour of *Bourdeaux* wine: the lower part un coagulated, and like *Tent wine*.

9. It is to be noted, that the reflexion of the Glaſſes in all the *Liquors*, they being held up to the light, (except the ſpirit of *Sal Armoniack*) did create a *corona* of ſeveral colours, mixt with *green*, *blew*, and ſo as not one reſembled the other. That with the *oleum Tartari per deliquium* reſembled the *blew* in *Bourdeaux* wine, with an *eye of green*.

I had forgot to relate how *I* kept ſome of the blood in a ſeparate *Pottinger*; and it ſeemed excellently well coloured; when it coagulated, the top was of a due *red*, the bottom *blackiſh red*; the *ſerum* of a due *tranſparency* and *proportion*, and not tinged to *citrine colour*: and coagulated all as the *white of an egge* over a gentle fire.

I poured alſo upon the blood in two other *Pottingers*; upon the one *ſpirit of Harts-horn*; on the other ſpirit of *Sal Armoniack*, but not much: perhaps a dram or more: that with the *ſpirit of Harts-horn* at firſt ſeemed more florid, then that with the *ſpirit of Sal Armoniack*: both coagulated into Maſſes after a while, and were then both of *one colour* on the ſurface: but that with the *ſpirit of Sal Armoniack* coagulated its Maſs ſo as to break from the ſides: that with the *ſpirit of Harts-horn* did not break from the *ſides*; whether the blood of one, and the other might differ, *I* know not; but both *immediately* followed one the other. That *blood* which had nothing *mixed with it*, after coagulation, differed

fered not from the other two, though they were covered over with the *ſpirits* as ſoon as they were taken, and that expoſed only to the *Air*.

After a while upon the *ſurface* of that with the *Kings-Bath-water*, there was a kind of fatty *cremor* which covered the whole *ſurface*; and ſo on that with the *Queens-Bath-water*: the others had none at all.

On *Munday* after dinner, the next day after I had bled, I came to obſerve again; and found,

1. That with the *Sal fraxini* to be more and more diaphanous, reſembling *Bourdeaux* wine: that with the *Sal abſcynthii* leſs *diaphanous*, but red ſtill.

2. I obſerved the *Solution of Allom*, and however it looked black, yet being held in a clear light, one might diſcover in it viſible appearances of a *deep red*. I poured on it ſome ſpirit of *Sal Armoniack*, to ſee if it would reſtore the *colour*: but in ſtead of that the *liquor* coagulated preſently into little *maſſulæ* or flakes, reſembling raw fleſh when the *blood* is waſhed out.

3. There was no alteration in that with the *ſpirit of Sal Armoniack*.

4. That with the *Queens-Bath water* continued *more diaphanouſly* red towards the top: but that with the *Kings-Bath water*, did not loſe its *redneſs*, though it were not diaphanous near the ſurface.

5. Of the two Pottingers in which were *the ſpirits of Harts horn*, and *Sal Armoniack*, though both were coagulated, yet that with the *ſpirit of Sal Armoniack* was the moſt *florid*.

6. That with the *Oleum Tartari per deliquium* continued red, but loſt its *diaphaneity* at the top almoſt quite.

7. That with the *Sal prunellæ* after the coagulated *Maſs* had ſubſided, had on the top of it in the middle of the *Glaſs*, to the bredth of *ſix-pence*, a concrete *gelly*, exactly reſembling that of the cleareſt *Harts-horn*, not boyled up to its greateſt heighth; from

from hence protended certain filaments, with which it was faſtned to the *maſs of blood*, which was *buoyed* up thereby, ſo that it touched not the bottom; the *jelly* was *inſipid* and ſtuck to my finger, when I touched it: whether that little which did ſo adhere took off from the *equipollency* of the two bodies; or whether I broke caſually ſome of the protended filaments, or from what other cauſe I know not; but after a while the Maſs ſunk quite to the bottom, and drew the *gelatine* below the ſurface of the water.

8. Upon the pouring out of the blood, that with the *Queens-Bath water* happened to ſeem of a *pure Claret*, like *Bourdeaux* wine, no *ſetling*, or *floating filaments*, but *ſomething red*, which reſembled exactly the flying Lee in botled *Claret*.

9. That of the *Kings-Bath-water* appeared as the former, only at the latter end, as it was poured out, there was a certain *gelatine* mixed with it, and ſticking to the ſides, that for *colour* and *conſiſtence* exactly reſembled the *jelly* of red currants.

10. That with the *ſpirit of Sal Armoniack* upon effuſion, appeared like deep *Bourdeaux* wine, and ſo from top to bottom *without any alteration*.

11. Upon the effuſion of that with the *ſalt of Wormwood*, it appeared alſo like to *Bourdeaux* wine; but towards the bottom there was *Gelatine* red, like that of *red currants*, more tenacious and in greater quantity then was in that *mixture* with the *Kings-Bath-water*.

12. That with the *ſal fraxini* poured out like *common* or *leſs deep Claret*: at the bottom there was no *Gelatine*, but it ran a *little thicker* like to *Tent wine*.

13. That with the *Oleum Tartari per deliquium*, upon its firſt effuſion ran like *Claret* a little *decayed*: but the *moſt of it* dropped, as if it were a weak *Gelatine*, and ſo continued to the laſt, being almoſt of as *deep colour* as a ripe *Mulberry*; I poured upon ſome of the ſaid *jelly* almoſt as much of the *ſpirit of Sal Armoniack*, and it immediately diſſolved all the *jelly*, and made it *fluid*, yet ſo as that the *bloody craſſament* appeared *unequally mixed*, ſome parts being more *deep* and *opacous* then others.

14. I

14. I took the Pottinger in which was the *blood* with the *ſpirit of Harts-horn* affuſed to it, having ſeparated the *maſs* from the *ſides* of it, I poured out the *Serum*, which was as *black* as *common Ink*: the *ſurface* was *red*, but not ſo *florid* as that with the affuſed *ſpirit of Sal Armoniack*: moſt of the *melancholy blood* ſeemed diſſolved into that black *Serum*, the ſuper-incumbent *maſs* being *thin*.

15. That *blood* on which the *ſpirit of Sal Armoniack* was poured in the Pottinger, appeared from top to bottom *red*, only in the bottom there were ſome little ſpots of a *blackiſh* and *darker red* then the other parts: on the ſurface there was a *Gelatinous pellicle* generated: the *Serum* was of a *citrine colour*: the *conſiſtence* of the *coagulated maſs of blood* here was more *tenacious* and *fibrous* then in that other Pottinger with the affuſed *ſpirit of Harts-horn*: There was no *pellicle* diſcoverable upon that with the *ſpirit of Harts-horn*; upon that with the *ſpirit of Sal Armoniack* ſo tough an one, that it would bear up a little way in your hand the whole *maſs of blood* adhering to it.

16. The *blood* which was kept in a Pottinger *without any mixture*, being placed in an *arched fire* on a fire-ſhovel burned with a *bright* and *continued flame*, as if it had been *Turpentine*, but crackled like a green *bay-leaf* caſt into the fire: and ſo it did being caſt *immediately into the fire*, but the *crackling* was leſs *durable*, by reaſon of the *vivid fire* into which it was caſt. It is to be noted that this pottinger having been removed into the *Sunne*, all the *Serum* was *exhaled* or *incorporated* into the *maſs*, which was grown to the bottom of the Pottinger, and dried there, ſo that I ſcraped it off: whether that might adde to the *Phænomena* I know not.

17. The *blood* in that Pottinger where the *ſpirit of Harts-horn* was affuſed, being taken out and placed in an arched fire, roſe up with an *equal intumeſcence*, as a *cake* doth in an *Oven*; it *crackled* much leſs then the *unmixed maſs of blood*: It burned *ſlowly*, with a *continual* but not *vivid* flame, and in ſuch a manner as if the *maſs* had never *taken fire*, but only the *ſmoke* iſſuing from it; for one might eaſily ſee an *interſtice* betwixt the *maſs* and *hovering flame* all the

while, till it came to a perfect *Ignition*.

18. The mass which had *spirit of Sal Armoniack* affused unto it, being placed in an arched fire, did rise with an *equal intumescence*, but greater then that with the *spirit of Harts-horn*: it *crackled* less then that with *spirit of Harts-horn*: the *flame* at first resembled that of the other; afterwards instead of *hovering* about, it seemed to issue *immediately* from the *blood*, and not to appear like a *smoke* that took fire within the *arch*; the *flame* then was *vivid*, and *continued*.

19. The fire being an exceeding *quick fire*, I poured some of the serous blood that was in the Pottinger, impregnated with the affusion of the *spirit of Sal Armoniack*, and as it *dried* it took fire *presently*, the flame resembled that of the former *mass*, only it wasted *faster then that*, being cast upon so *quick* a fire: The *black Serum* of the coagulated *mass* with affused *spirit of Harts-horn*, though cast into the *same fire*, would scarce *burn at all*.

20. I took some of the *mass* that was impregnated with the *Sal prunellæ*, and placed it in an arched fire (the *Serum* or Solution poured off from it was *insipid*) it rose with an *unequal intumescence* copling, like a *loaf*, in the midst: I brought it to a perfect *ignition* and *coale*, yet did it not *crackle* at all, neither *burn* till the last, and then but a *little*, and with an *interrupted flame* which seised now *on this*, now on that part: nay, there was but very little sign of any *Sal prunellæ* in it to *sputter* as it *burned*.

21. I told you how I poured some *spirit of Sal Armoniack*, upon the mixture of *blood and a Solution of Allom*, and of the odd coagulation that hapned thereupon into white *massulæ* which seemed like *flesh* when the *blood is wasted out of it*: I took of those *incoherent flakes* or *massulæ*, and putting them to burn in an *arched fire* upon the *fire-shovell*, it run all off, upon a *great ebullition*, into the *fire*: I took the red hot *fire-shovell*, and placed some more upon it, which seemed to burn as *Allom* doth in the like case, and so stayed on it: but being put into the *arched fire*, and brought to *ignition*, it would neither *flame*, nor *crackle*, nor left any visible quantity

tity of *coale* or *aſhes* behinde it, as if it had almoſt all *evaporated*.

22. Theſe were the *Phænomena* which I had opportunity to take notice of at *that time*: but I alſo left a *Solution of the Alcali of Nitre* of about three ounces with the Apothecary, if any elſe came to bleed there in my abſence: upon bleeding, an healthy young man that was ſomewhat indiſpoſed, ſome was ſuffered to *ſtream* into that *Solution*: at firſt it was of a *florid red*, but paler then *blood* uſually is, reſembling a *baſtard-ſcarlet*: after ſome days ſtanding *I* found it of a *deeper red* from top to bottom: one half of it was *tranſparent* like to the *duller* and more *decayed* ſort of *Claret*: the other half ſeemed like *Tent-wine*, not *diaphanous*: on the *ſurface* there was a *cremor* which extended it ſelf almoſt all over it: Upon pouring it out, it appeared *all* to be of a *blood-red*, only that which ran *laſt* was of a *deeper dye*: at the *bottom* there was a kinde of *Gelatine* like to that of *red Currants*, which rendred the one half of it *opacous*: it was no way diſ-*coloured*, nor *unequally mixt*: the *ſpirit of Sal Armoniack* being poured on it, did render it *fluid* preſently and *tranſparent*.

Having occaſion after ſome weeks ſtay at the *Bath*, to ride in *extream hot weather* above 200 miles in a few days, and being tired with watching and the journey, and being wet very much with a great ſhower of rain at my return, I went immediately into the *Groſs*-*Bath* for half an hour, to prevent any inconveniences that might befal me upon ſuch travel: but at my coming out of the *Bath* I felt ſo violent a defluxion into my *throat*, and the adjacent *Glandules*, that I apprehended ſome danger of a *Squinoncy*, which yet *I* avoided by *bleeding*, *purging*, and other means together, with the uſe of the *ſame Bath* after all: when *I* was to bleed, *I* was willing to try ſome further *Experiments* in *Liquors*, different from the *former*, and the Obſervations *I* made were theſe.

1. I cauſed *two veins* to be opened in the *left arm* at once, and received one Pottinger out of the *Mediana*, and the other out of the *Cephalica*: my intent in that was to obſerve (as I had done once before in my ſelf) whether the blood of *two veins* in the ſame arm would yield *different blood*: if *ſo*, then I thought that it might not be indifferent in what *vein* a man *bleeds*, though they all ariſe from one *trunk* of the *vena cava*; and that we might juſtly have regard to thoſe *cautions* of our *obſerving Anceſtors*, not to *bleed* thoſe veins *promiſcuouſly*, but ſome *in one caſe*, and ſome *in another*. I was confirmed in thoſe ſentiments by the *Phænomena* I met with a ſecond time in the *trial*, as other obſervations have ſatisfied me about the doctrine of *revulſion*, and its truth. Having taken one *Pottinger* out of the *Mediana*, and another out of the *Cephalica*, I ſtopped the *Mediane*, and continued to bleed into the *liquors* out of the *Cephalick*. In the firſt, iſſuing out of the *two bloods*, I could finde no *difference* in the *colour* or *conſiſtence*; but after ſtanding three or four houres, that of the *Mediane* had much *leſs* of *Serum* in it: the *Serum* thereof ſeemed *Limpid* in the Pottinger: but that of the *Cephalick* was *citrine-coloured*: that of the *Mediane* ſomewhat of a *volatile ſaline* pungency upon the tongue, different from the *taſte*, which the other *Serum* had, *that* being *very ſalt*: that of the *Mediane* had a *blewiſh Gelatine* gathered upon the top of the *condenſed maſs of blood*; the other had *none*, but was of a florid red on the top. After two days I came to look on *them* again, and upon turning the *coagulated maſs of blood* in the pottinger, that of the *Mediana* had much more of *black* towards the *bottom*, then the other: and alſo a *thinner ſurface* of *red* then that of the *Cephalick*.

2. To carry on the *Experiment* of mixing ſeveral *liquors* with *blood*, I bled into ſome *ounces* of *Aqua mirabilis*, which grew *deep-coloured* almoſt unto the top, which was *tranſparent* and of the colour of *Mant-wine* almoſt: after ſome houres the *Liquor* became of a *bright* beautiful *Claret-colour* almoſt unto the *bottom*, where there was an *opacous*, *darkned ſetling*, with an *enaorema* of *contexed filaments* pretended

to

to the top. The *Waſps* flocked to *that glaſs* in great numbers, and drowned themſelves in *it*, not medling with any other of the ſubſequent *glaſſes*. After two days was little changed, only the beautiful *Claret* was ſomewhat *darkned*.

3. I bled upon ſome ounces of *Treacle-water*, which turned as *black* as *Ink* preſently, but continued the blood perfectly *fluid*: The *red* was ſo deſtroyed, that the *Aluminous* Solution did not equal it; there not being upon *inclination* of the *glaſs* the leaſt ſign of any *incarnadine*; and ſo it continued for two days, no variation happening.

4. I bled upon ſome ounces of *Cinnamon-water*, which turned of a *pale red*; if I held up the *glaſs* to the light, it ſeemed almoſt to the *top opacouſly red* as *Tent wine*; but, if viewed otherwiſe it ſeemed of a *paler red*, approaching to *baſtard-ſcarlet*. After a while it ſeemed as if all the *blood* were coagulated into one *maſs* from *top to bottom*, ſubſiding a little within the tinged *Cinnamon*-water. Upon *agitation* and ſtirring with a *knife*, it appeared that the *fibres of the blood* were ſo deſtroyed, that this *maſs* was no *coherent* thing, but broken into little *maſſulæ*, or parcels of a *pale red*, ſuch as the *ſubſiding curds* are in *whey*. After two days I viewed it, and found the *Phænomenon* of the whole Glaſs to look *cherry-coloured*, but the *incoherent maſſulæ* were of a *pale red*.

5. I bled into ſome ounces of *Aqua Bezoartica*, that did coagulate with the *blood*, ſo that it all fell in one *incoherent maſs* towards the *bottom*: but whether there hapned to be a greater proportion of *blood* in the glaſs, or for ſome *other cauſe*, the coagulated blood filled almoſt all the *water*, much beyond what we obſerved in the *Cinnamon-water*: the conſiſtence of the *one*, and the other *maſſulæ* were like the *curds* in whey; theſe were of a *pale red* retaining to *whitiſhneſs*; and ſo it continued two days; the *ſmall quantity* of *water* appearing in it giving no opportunity for further *Obſervations*.

6. I bled upon ſome ounces of *Nantes*-Brandy, it gave us a more *tenacious curd* then the former, of a *pale red*: but the *maſs* and *liquour* was *opacous* towards the bottom, ſo as to

appear

appear like *Tent-wine*, in what light ſoever *I* placed it. After two days that of the *Brandy* which was *fluid*, (the *curd* not being anſwerable to the *Aqua Bezoartica*) was of a pretty *florid red*, the *coagulated maſs* was of a *brick colour*.

7. *I* bled upon ſome ounces of *Aniſe ſeed water* drawn from the grounds of beer, it yielded a mixture of a *deep blood red* from top to bottom, ſomewhat tranſparent. The maſs coagulated from top to bottom, the curd was of a deeper red then the others, and of ſuch a tenaciouſneſs as is to be found in the ſoft curd of *poſſets*. After two days it turned *blackiſh*, the *coherent* curd being of a little *lighter red*.

8. My *indiſpoſition*, and other cares permitted me not to proſecute theſe Experiments as *I* did the other: but one curioſity more poſſeſſed me, to put two drams of *ſpirit of Harts-horn* into a pottinger, and to bleed thereupon, to ſee if it would alter the *Phænomenon* from what it is, if the *ſpirit of Harts-horn* be poured on the blood: *I* did ſo, and *I* found *at this time* that it kept *my blood* from coagulating into ſuch *maſſes* as otherwiſe it would, but the blood turned *blackiſhly-red*, and in it there was obſerved a *crimſon gelatine*, which run off the knife as *jelly* of *red currants* would, when beginning to *cool*. After two days it continued *ſtill fluid*, but *blackiſh*. I have ſundry times tried that way of putting *ſpirit of Harts-horn* into the pottinger firſt, and then cauſed them to bleed upon it with this ſucceſs, that immediately it ſpoiles the *red*, giving it a more *dirty colour*, and caſts up a *mucous phlegme*, (ſuch as I never ſaw in any blood upon *other Eſſays*) juſt like what many *ſpit* and *blow out of their noſes* in catarrhs: this covers all the pottinger, without any mixture of blood in it, and would be *white*, but that the *ſubjacent blood* gives it another *muddy colour*. The blood under it was always *fluid*, and unequally mixed with parts of a bright and *blackiſh red*. Whether my *journey*, or diſtemper prevented that *appearance* in my *blood*, *I* know not.

9. I had a Patient there which had unknowingly taken much of *Mercurius dulcis* in pills at *London*, to

her

her great prejudice ſeveral ways: and though ſhe had taken *golden-bullets*, and uſed other means to diſcharge her body of that *troubleſome Inmate*, yet found little benefit: At the *Bath* I let her blood, and to try an *Experiment I* caſt a *Guinny* into one of the *middle Pottingers* as ſhe bled: I could obſerve no difference betwixt the blood preceding, and that therein: but in the *afternoon* I came and went to that pottinger which had the moſt *florid* and beſt *coloured blood*, and ſearching *there* found my *gold*, and that ſtained with white *ſpots* from the *Mercury* on the *lower ſide*. Whether the *ſeparation* of the *Mercury*, or ſome other efficacy in the *Gold* (of whoſe power in ſuch caſes I can give good inſtances) cauſed that difference in the *bloods*, *I* cannot tell, having never tried it ſince.

Being not well at Warwick, *by reaſon of a violent defluxion into the* Glandules *of the Throat, I cauſed my ſelf to bleed* Octob. 20.

1. *I* took ſix drams of ſpirit of Harts horn, not very well rectified, nor clear of colour, and put it into a cryſtal-glaſs; and bled thereupon about half an ounce of blood; it turned of a *dark red* preſently, inclining much to *black*, though, as it *ſtood*, or as it was *held on one ſide*, you might perceive a lighter, but not *florid* red at the ſides. *It* ſeemed *fluid* for two dayes; but as I poured it out it appeared to be very *Gelatinous*, and of colour like that which is become *ſanious*, and degenerated into *blackiſhneſs* with keeping.

2. I bled upon the *ſame liquor of* Salt-peter, about half an ounce of *blood*, upon four ounces of *liquor*, at firſt the blood did turn on the ſurface to a *baſtard-ſcarlet* (which is an effect every thing of *Nitre* mixt with *blood* ſo produceth) after-

afterwards the whole blood sunk to the bottom, the upper part being all of *one colour* and *consistence*, such as is observed in the *Serum* of the blood sometimes, when the *supernatancy* is whitish, and not transparent. Being poured from the *blood*, I found that coagulated into a *mass*, which was all of a very *natural red* all over, only *spotted* in many places underneath with *black spots*. The *concretion* was so brittle, that it would not hang together, nor endure any *light-pressure*, but as it were *melted*, and seemed *gelatinous*.

3. I bled upon a *Solution of the Alcali of Nitre*; it appeared upon the first mixture like *bastard-scarlet*; then the blood sunk to the *bottom*, the *top* being *transparent*, yet of the colour of *High-countrey-white-wine*: the bottom seemed *redder* then that of the *former*; the *limpid* liquor being poured out, seemed all *gelatinous*, and had incorporated with it the *serous* part of the *blood*: the *red* at the *bottom* was *fluid* and not *tenacious*, but of the consistence that blood is of when it is *hot*, and newly received in a vessel out of the *veins*.

N.B. After I had poured out the *blood* and *mixtures* out of the several glasses, and that the glasses had stood a while, I observed that that of the *raw Liquor of Nitre*, which remained in the bottom, did turn of a most beautiful red, as ever I saw in any thing: but that with the *spirit of Hartshorn*, or *Solution of Alcali*, &c. did not vary: after two days all the remains of *blood* in the several glasses turned *blackish* and *sanious*, only that with the *raw liquour* altered not.

4. I bled upon the *liquors of Salt-peter which had passed the ashes*, and on that *which had never passed the ashes*: both were of the same *blackish* and *sanious colour* (after the *first bastard-scarlet* was past) both had on the top a certain *cremor*, which being cast into the *fire* discovered it self to be *nitrous*: both of *them*, though they were of such a *dirty red* inclining to *black*, yet were they of *one consistence* from *top to bottom* all *fluid*, nothing *gelatinous*, nor any one part *blacker*, or redder then the other. Which is very much, considering the difference of the *two Liquors*.

5. I bled upon the *unctuous Mothers of Salt-peter*, which turned at *first* to a *bastard-scarlet*: the *blood* did never *mix* with

with the *Mothers*, nor otherwiſe ting *their* colour, then as it caſt a ſhadow by its innating on the ſurface of *them*. It *coagulated* on the top of the *Mothers*, being of *colour* all thorough exactly like to *Ocher*: the *concretion* was a quarter of an inch thick, a firm maſs *to ſee* to, like ſo much *bees wax* caſt into a cake: I took it up in one maſs with my knife but trying its *tenaciouſneſs*, I found it as brittle as moſt *ſhort cakes* are. Upon the *ſurface*, there was an appearance of certain *ſtriæ*, which might be *ſaline*. All the blood did not *coagulate* ſo, but underneath there was a quantity which in the glaſs was of *equal dimenſions* with the *other maſs*, it was of the colour of *Oker*, and *fluid*, and would not mix with the *Mothers* at all: I took of the *maſs*, and tried to burn it in an arched fire twice or thrice, it boyled and bubled up upon the fire-ſhovel, like impure *Niter*, and ſo burned with a flaſhing, as if it had been moſt of it *Peter*, it never came to flame as *blood* doth *uſually*; only one blaze as it were always *hovered* over it for a moment or two, not being continued to the body, otherwiſe then by a parcel of *ſmoke* iſſuing out them.

6. I took alſo two pottingers of blood, the *firſt* and the *laſt* of the *blood* I took away: there was no difference in the blood of one and the other; the coagulated maſs well-coloured, of a good *conſiſtence*, leſs of that *black* or *melancholick craſtament* then is commonly found: the *Serum* well-*coloured*, of taſt *briniſh*: I placed it in an *arched fire*, it roſe up with a *globous intumeſcence* (but crackled not ſo much as at *Bathe*; though very much, and like a *bay-leaf*) it burned with a continued, vivid, and laſting flame.

I ſuffered a *pottinger* of the ſame blood with which this laſt *Experiment* was made, to ſtand ten days or more, in which time it was quite dried up into a *hard fryable* maſs, the top of which was almoſt as black as *Ink*, the *bottom* having ſomewhat of a *dark red* in it. I caſt *a piece of it* into a quick *coal-fire*; therein it *crackled* like unto a *bay-leaf*, but burned with a ſhort and *weak flame*. I placed another part of *it* upon a fire-ſhovel in an *arched* and *quick fire*, where it *crackled* as much as the *other* did (and more then that part

of the *ſame blood* which was burned in the fore-going *Experiment* of blood *newly congealed*, and ſeparated from the *Serum*, which was in this laſt caſe dried into the *maſs*) and it did burn with a *vivid* and *continued flame* preſently. Which accident *I* take notice of, to ſhew the different *Phænomena* upon the *diverſe way of burning the blood*. I took a third portion of the ſaid *congealed* and *firm maſs* of *blood*, and put it to ſome *cold water* in a Glaſs, and it diſſolved moſt of it *therein*, and tinged the water of as beautiful a *red* as any *claret*, though otherwiſe the *maſs* were *blackiſh*, and had nothing of *red* but what was in the *extimous* cruſt of the bottom, which ſeemed of a moſt *deep red* inclining to *black*.

I ſuffered *two* or *three ſpoonfuls* of *Hogs-blood* to run into a large *Venice*-Glaſs, in which was halfe a pint of the *Mothers of Peter*; I ſuffered it to ſtand ſome days, and comeing then to *ſee it*, I obſerved that the *Mothers* were become *opacous* almoſt to the *bottom*, on the top was a maſs of coagulated blood exactly reſembling the colour of *Oker*; it was ſo firm, that I took it with my *knife* in one *entire piece*, but I found the *top* and *bottom* of the maſs (which was pretty *thick*) to be very ſoft, but not as it were *fibrous*; the middle was more *firm*: I put ſome of it upon a *fire-ſhovell* in an *arched* and *quick fire*, when it *boyled* up, and *ran about*, and by its *ſputtering* diſcovered a mixture of *Salt-peter*: but it did not *flame* at all, though I brought it to ignition. Examineing the remaining *Mothers*, I found a *ſanguine mixture* to *float in*, and ſtain the liquor of an *Oker-colour*, and ſome of it was aggregated into *little maſſes* or *lumps*, whoſe particles did not cohere by any *tenacious fibres* (indeed I have not been able to obſerve any *tenaciouſly-fibrous coagulations* in the blood of *Hogs* hitherto) but upon the leaſt touch of my *warm hand*, they diſſolved or yielded unto the leaſt *preſſure*. Out of all which *I* intend to deduce, that *ſome common Experiments may ſhew that, which no Chymical Fires give any light unto*. That *there is a great diverſity betwixt the blood of other Animals, and that of Men*: becauſe that upon the *ſame Liquors* they diſcloſe *different Phænomena*; and conſequently that the *Tranſfuſion* is a *raſh* and *unſafe attempt*.

I ſhall conclude with this *intimation*, that neither is the blood of *ſeveral Animals*, nor the *blood* of the ſame kinde of *Animals* the ſame; but in *taſte* and colour of the *Serum* there will be often a ſenſible difference, and it is rational to think the like of the blood it ſelf: nor do they *burn* or coagulate alike, or with the like *Phænomena*: nor is the blood of the ſame Men always the *ſame*, though he continue within the latitude of *Health*; and in diſeaſes *Epidemical* let two *bleed*, and there ſhall often be no affinity in the colour of their *blood*, or in the *Serum*, the one being *white* and *turbid*, the other *Limpid*, the *Serum* of the third *citrine-coloured*. And if ſo, what *regulations* ſhall we have for this *operation*: ſhall a *transfuſe* he *knows not what*, to correct *he knows not what*, God knows *how*? This may become indeed that ſort of *men*, being the *worſt* and moſt irrational *Empirics* the Sun ever ſhined upon, as I demonſtrate more fully in my Letter to a *Phyſician*, in a Parallel betwixt them and the *ancient Empirics*.

The other day coming into my *Apothecaries* Shop, and finding one (not otherwiſe very ill) going to *bleed*, I ſent for a bottle of that *Lixivium* of *Salt-peter* which had paſſed the aſhes, and into the firſt *portinger* which he *bled*, which ſeemed to have little of *crimſon* in it, but a *Serum* of a *dark-blew* colour; I poured a little of it, and it turned *black*, though it continued *fluid*: Into the *third portinger* which ſeemed better blood, with a *red colour*, I poured ſome of the *ſame liquor*, and it improved the *colour*, and kept it from *coagulacion* awhile; what hapned afterwards I had not leiſure to obſerve.

Let them from theſe *Obſervations* draw their *ſophiſtical Concluſions* for and againſt *ſpirit of Harts-horn*; for, and againſt *ſpirit of Sal Armoniack*; againſt *Allom*, and *Treacle-water*, and ſuch like; till *all the world* come to admire them as much as *I*: And that there be a new *Hiſtory* penned to render them as *contemptible* as this *magnifies*, by a *Rhetorick* that hath more of the nature of the *Microſcope*, then of *Truth*.

Miſcellaneous Additions by way of Poſtſcript.

WHatever may ſeem to be ſaid from hence in favour of the ſpirit of *Harts-horn*, is not ſo *valid* as may be imagined: for *I* have mixed a little of the Solution of the *Alcali* of *Nitre* (which turned *Syrup* of *Violets* green,

and rendred it leſs *fluid*) upon the *blood* of a *man*, which was *blackiſh*, *wateriſh*, and *ill-coloured*, after it began ſomewhat to coagulate, and I brought it to a new *fluidity*, and as *vivid* a red as ever I ſaw: and ſo it continued for 24 hours; at my return after two days, I found the blood in the Pottinger, (by reaſon of the Sun on the window) all coagulated, and become *friable*; but even that it had viſible ſigns of a *remaining redneſs*, which the other blood that had nothing effuſed retained not. *Oyl* of *vitriol* affuſed to the *Serum of blood*, tinged with the *crimſon part*, doth improve the *red* for an *inſtant* or *two*, but then it turns *black* and coagulates into a ſoft maſs, that admits the leaſt impreſſion; the *fibres* being deſtroyed: but yet it burns rather *better*, *brighter*, and *quicker* then otherwiſe; being poured on the ſurface of coagulated blood, on the top whereof was tough *pellicle* generated; it did not eat the *pellicle*, but in one night reduced the Maſs, almoſt to the bottom, into a conſiſtence like to *Bees wax*, which *burnt* well.

In *January* laſt 1669. I had another occaſion to bleed, but though the *Phænomena* of my blood upon the *Mothers of Salt peter* were the ſame as at firſt; yet in the other mixture with *Salt-peter-liquors*, they were not: the *blood* ſeparately taken ſeemed not to differ from the former, only the *Serum* was a little yellower: it did burn as well as *before*, but *crackled* much leſs. At the ſame time I cauſed an old man to be let *blood* for a *catarrh* and pain in his ſhoulder, which he uſed to eaſe with bleeding; the *blood* ſeemed very good and well-coloured; after it had ſtood a while I had the leiſure to view it, and upon one pottinger of coagulated *blood*, I poured twenty drops of ſpirit of *Vitriol*, whereupon immediately all the top turned as white as *milk*, even the *bubbles* which ſeemed of *blood* before: whereupon I took another pottinger, and ſeparated half the *blood* from the *Serum*, and poured on the blood and *Serum* ſom ſpirit of *Vitriol* as before: preſently all the *Serum* became of colour and conſiſtence like milk: the *blood* turned *black*, and hardened into a ſubſtance that cut like *white-waſhed-wax*: the other, at my return, I found of the conſiſtence and colour of a common *cuſtard*. The *vitriolated*

triolated Serum would not *flame*: the *vitriolated* blood did burn with a *brisk* but ſhort flame: the *ſimple blood* would ſcarce burn at all, but with an *hovering* and *diſcontinued* flame.

I took alſo ſome of the pure *citrine* Serum of my blood, which taſted not very *ſalt*; I ſet it in the window for ſome time: during the *froſt* it coagulated into a body of the *conſiſtence* of *butter* in the heat of *Summer*: it gathered no *Ice* at all: the *colour* became leſs *citrine*; but ſtill *pellucid*. I ſet it after ſome days to thaw; which it did immediately before the fire, but came not to its former *fluidity*, but like oyle: after that, it coagulated with the warmth *before the fire*, and ſeemed exactly like to boyled *Turpentine*, but that it wanted the ſmell: it would not flame at all (though crackled much, as ſalt) yet I brought it to *ignition*.

I did alſo take ſome *Hogs blood* again, and poured on the *Mothers of Peter*, it mixed not; only after ſome days ſome *filamentary corpuſcles* ſubſided unto the *middle* of the liquor: the colour at firſt was a *pale baſtard ſcarlet*: but after a day it turned to a *darkiſh red*, and ſo continued many days; and in its primitive fluidity, it ſuffering not any alteration, but being as *fluid* as when it firſt iſſued from the *veins*: it ſtood in the window all the froſt, not changing or freezing at all. No more did another pottinger of *my blood* that was mixed with the *liquor of Peter which had paſt the aſhes*: but that laſt *blood* turned very *blackiſh*.

In fire, notwithſtanding any thing I have done or purpoſed about the *nature of blood*, I do now deſiſt from the Enquiry: the reſult of my thoughts being *this*, that there is a continual variation in the blood upon every diſeaſe, and often without it, during a *ſtate of health*: that the blood of *Individuals* of the ſame kinde differs not only from it ſelf, but in each other individual: that no man can by reaſon of this conſideration know what he would *transfuſe*; nor what it is he would *rectifie*. In a word, that 'tis moſt prndential to inſiſt upon *Experienced Methods* in *Phyſick*, and that all *phancies* about *ſpirit, ſalt, ſulphur*, fermentative fires in the heart, occaſioned by *heterogeneous mixtures*, and the explications

plications of the operations of *Medicaments* by the *new Philosophers*, either *Chymical* or others, are all *vain*, and cannot be allowed as a *ground of practice*, till justified by *successful trials*; seeing that not only the *suppositions* are false, but whilst the *blood* is *sub diminio animæ*, effects *upon it* are *different* from what when it is separate: and I think *I* may thence *conclude* rationally, that 'tis not conceivable that the fabrick of our bodies is purely *Mechanical*: for the *liquors* would have the same effect *on the blood in the body*, and *without*: which *they* have not.

A REVIEW of the precedent Diſcourſe againſt Mr. GLANVILL.

AFter *I* had written the preſent *Diſcourſe*, *I* was ſo unwilling to give any offence to the world, and ſo *apprehenſive* leſt my *juſt indignation* for the *affront* Mr. *Glanvill* had put upon *my Faculty*, ſhould tranſport me beyond all *fitting* moderation, that *I* deſired a *Friend*, (without further adviſing *with me*) to blot out whatever he might *in prudence* think equitable; by reaſon of his great *cautiouſneſs*, as well as thorough that great *haſte* and *continual interruptions* wherein the Treatiſe was penned; *I* finde ſeveral paſſages either omitted totally, or not ſufficiently explained; ſo as that *I* could not acquieſce in the *publication* thereof, without ſome *few* additions, partly to prevent ſome *cavills* that might (though *weakly*) be raiſed againſt it, and partly to put *every thing* paſt diſpute hereafter; that ſo *I* might not have any further occaſion to write againſt our *Virtuoſo*, nor *his Abettors* have any thing to do but to call in his *Libell* againſt the *Phyſicians*, and do ſome *reaſonable juſtice* to thoſe *he* had ſo arrogantly and *injuriouſly* inſulted over. *I* deſire my *Reader* to pardon me, if *I* have not in ſome *circumſtantial embelliſhmeats* and *regularity of procedure* anſwered *his expectation*, ſince in the *main I* am ſure I have *out-done* it.

Whereas *I* charge Mr. *Glanvill* (page 2.) with *not having read the Authors which he mentions.* Theſe words, *Who can chuſe but ſmile, when he reads how* Apuleius *improved the Mathematicks* after *Euclide*? the whole paſſage ſhould have run thus; *Who can chooſe but ſmile* when he reads how *Apuleius* improved *Arithmetick*? All that *Apuleius* did was to to tranſlate *ſomething* about *Arithmetick* into *Latine*, at ſuch time as the *Latines* had no other Numerals then L. M. D. C, &c.

&c. And by reaſon of *this performance* of *his* doth *Voſſius* give him a place amongſt the *Authors*, not *improvers* of *Arithmetick*: and takes notice of *him* as the *firſt* that ever writ in *Latine* about *that ſubject*. Upon which account it was *judiciouſly* done of *Voſſius* to mention him there; but Mr. *Glanvill* is groſly] miſtaken *here* to name *him*, where he treats of ſuch as *advanced uſeful knowledge*; which a bare *Tranſlation* doth not. It is true, *Voſſius* ſaith of *Apuleius*, *Primus Arithmeticam Latinis literis illuſtravit*: which words import no more then I ſay; and 'tis manifeſt, that what *He* did was but a *Tranſlation* of *Nichomachus*. So *Caſſiodorus de mathem. diſciplinis. cap. de Arithmetica. Reliquæ diſciplinæ indigent Arithmetica diſciplina, quam apud Græcos Nicomachos diligenter expoſuit.* Hunc primum *Madaurenſis Apuleius, deinde magnificus vir Boethius* Latino ſermone tranſlatum *Romanis contulit lectitandum.* The ſame is aſſerted by *Iſidorus Hiſpalenſis*. This might our *Virtuoſo* have obſerved in *Voſſius*, when he read *him*: and what *Apuleius* performed is ſo *meanly* thought of by *Blancnaus*, that in his *Chronicles* of *Mathematicians* he affords *him* no place, though he mention the *Arithmetical* work of *Boethius*. The imputation I fix upon Mr. *Glanvill*, for not underſtanding what the *Authors* he mentions had writ, and about his not having ever *ſeen* them, is manifeſt to any man that ſhall not only trace him by *Voſſius*, but conſider the *ridiculous characters* he fixeth upon the *Writers* alledged, *viz. Ptolomy* of *Alexandria* made conſiderable improvements in *Optics*: and *Alhazenus* the *Arabian* is famous for what *he* did in it. From theſe *Vitellio* drew *his*, and advanced the Science by his *own* wit and *their* helps. * *Stevinus* corrected *Euclid*, *Achazen*, and *Vitellio*, in ſome *fundamental Propoſitions* that were miſtakes; and in the room ſubſtituted conſiderable inventions of his own. *Roger Bacon* writ *acutely* of *Opticks*. —— Any man will grant, that *he* who gave ſo lame

Voſſius de Scient. Mathem. c. 51. ſect. 1.

Apuleius Arithmeticam *Nicomachi* Geraſeni Pythagorici *Latine tranſtulit* teſte *Caſſiodoro* de mathem. diſcipl. cap. de *Arithm.* & *Iſidoro* Hiſp. Orig. iij. a Jonſſ. de ſcript. Hiſt. phil. l. 3. c. 13. p. 280.

Voſſius de ſcient. mathem. c 10 ſect. 6. *Blancanus* Mathem. Chronol. ſecul. 15.

Voſſius de ſcient. Mathem. Mr. *Glanvill* p. 47, 48, &c.

* *S. Stevinus* both *invented* and writ ſuch in all parts of the *pure* and *practical Mathematicks*, in *Geography*, *Geometry*, *Navigation*, *Mechanicks*, &c. that never did *any one*, no, nor all the *Virtuoſi* in *England* or *Europe*, ever *equalled*, or *purſued*: From hence 'tis apparent Mr. *Glanvill*, and his Abettors never read *him*: he was the firſt *Profeſſer* I know of, and before my Lord

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an account of *these Authors*, never was acquainted with them, nor understood *particularly* what *they writ*, or added of their *own invention*: whether *new theoremes*, or *different* and *new demonstrations* of *old known* truths. Whereas he saith that *Roger Bacon* was accused of *Magick* to Pope *Clement* the fourth, and thereupon imprisoned: but the accusation was founded on nothing but his skill in *Mathematicks*, and the *ignorance* of his *Accusers*. — Assertions of this nature are not so easily passed by, so many *learned* and *judicious persons* having reckoned him in the number of *Magicians*; such are *Joannes Wierus* and other *Dæmonographers*. That the said *Writer* might declaim against *Magick*, or deny the *possibility* of it, and yet *practise* it, is an usual procedure with (*a*) that sort of people: and that his *works* have in them sundry *Propositions* that are *superstitious* and *magical* is granted by *Delcio*; such haply was that which *Franciscus* (*b*) *Picus* says he had read in his book *of the sixth Science*, where he affirms, that *a man may become a Prophet*, and foretel things to come by the means of the Glass *Almucheti*, composed according to the rules of *perspective*, provided he made use of it under a *good constellation*, and had before-hand made his body very even, and put it into a good temper by *Chymistry*.

Bacon, of a *Society* to carry on *Experiments* in order to the rectifying *many errours*, and *improving* many *known truths*: an Admirer of the *Ancients*, and their *learning*.

Jo. *Wierus* de præst. dæm. l. 2. c. 2.

a Vide *Bodin.* in præf. ad dæmonomaniam.

b See *Gabr. Naudæus* his History of *Magick* ch. 17.

As to what I say about *Orontius*, I adde the words of Sir *H. Savile* in his Lectures, *p.* 71. *Josephus Scaliger* —— *homo omnium mortalium*, ne Orontio *quidem excepto*, ἀγεωμετρητοτατῳ.

Whereas I say (*p.* 3.) that the *ancient Physicians* did not only *cure cut-fingers*, and invented *Diapalma* and and other *Medicaments* in order thereunto. I adde (what I *know not how* was omitted) that it is notorious how all our *Herbals* and *Druggists* have explained the *nature* and *use* of *Medicaments* according to the *Doctrine* of the *Elements*, and qualities either arising therfrom, or from the *peculiar mixture* of the parts: and whosoever hath acted, or shall proceed according to *those notions* in compliance with the *Ancients*, shall not stand in need of

any *novel Method* from the *Virtuoſi* to ſalve a cut-finger.

What I have ſaid in the *firſt* and *ſecond* ſheet concerning the *Barometer* (as *they* call it) that it doth not determine *exactly*, neither the *weight* nor *preſſure of the aire, winde,* or *clouds,* is an opinion which the more *I think upon,* the more I am confirmed in; nor do *I* doubt that others will be as *ſcrupulous* as *I* in their *aſſent* to our *dogmatizing Virtuoſo,* when they ſhall ſeriouſly conſider what follows, and accommodate it to the *Elaſticity and gravity* of the *Atmoſphear.*

Firſt, when our *Virtuoſo* ſpeaks of the *Elaſticity of the Air,* he underſtands thereby a body whoſe *conſtituent particles* are of a *peculiar configuration* and *texture,* diſtinct from what can be aſcribed to *earth, water,* or *fire?* "That the *Air near* "*the earth is ſuch an heap of little bodies lying one upon ano-* "*ther, as may be reſembled to a fleece of wooll; for this* (*to c-* "*mit other likeneſſes betwixt them*) *conſiſts of many ſlender flex-* "*ible hairs; each of which may indeed like a little* Spring, *be* "*eaſily bent or rouled up; but will alſo, like a* Spring, *be ſtill en-* "*deavouring to ſtretch it ſelf out again. For, though both theſe* "*Hairs, and the Aerial corpuſcles to which we like them, do eaſi-* "*ly yield to external preſſures; yet each of them* (*by vertue of* "*its ſtructure*) *is endowed with a power* "*or principle of ſelf-dilatation; by ver-* "*tue whereof, though the Hairs may by a* "*mans hand be bent and crowded cloſer* "*together, and into a narrower room then* "*ſuits beſt with the nature of the body:* "*yet whilſt the compreſſion laſts, there is* "*in the fleece they compoſe or endeavour* "*outwards, whereby it continually* "*thruſts againſt the hand that oppoſes its* "*expanſion. And upon the removal of* "*the external preſſure by opening the* "*hand more or leſs, the compreſſed wooll does as it were ſpon-* "*taneouſly expand or diſplay it ſelf towards the recovery of its* "*former looſe and free condition, till the fleece have either re-* "*gain'd its former dimenſions, or at leaſt, approved them as* "*near as the compreſſing hand,* (*perchance not quite opened*) *will* "*permit.*

Mr. *Boyle* in his firſt part of Experiments of the Aire: *Experim.* 1.

I deſire my Reader to take notice about the Elaſticity of the Air, that the very names of *Elater* and *Elaſticity* are of a more ancient mention then the being of the *Society*: *Regius* and *Pequetus* uſe the terms: and that as to the *expanſive motion* of the *Air*, 'tis propoſed by ſeveral *Carteſians*, and before them by *Kircher* de maynet. l. 2 part. 1. progymn. 3. See alſo *Merſenn.* and *Schottus*'s mechanic pneumat. *hydraul*: So that the *Society* can pretend to nothing but the ſimilitude of a *fleece of wooll*, and the explicating it by *that way.*

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permit.—Againſt this *I* except not only that this *ſuppoſition* is far from a *ſenſible Philoſophy*; but that whoſoever would *weigh the Air exactly, and eſtimate the acceſſion of weight which the Air receives from winds, clouds, or vapors* (the thing Mr. *Glanvill* promiſeth us) muſt *weigh the Air* ſingly firſt, and in its *utmoſt degree of expanſion*, otherwiſe he can never tell what its *gravity* is, or what *acceſſional* it receives by its *Elaſticity*, by *exhalations* and different *mixtures*: But this is not done by the *Barometer* (however it be *eſſayed* in the experiment of *Ariſtotle* very *judiciouſly*) but only an imaginary *column* or *Cylinder of Air*, and its preſſure upon the *Mercury* is conſidered: which procedure ſeems to me as *ridiculous*, as if a man ſhould lay a *fleece of wooll*, or any other *body* upon any thing, and there being above that an *incumbent* body of *lead* (or the like) bearing thereon, yet ſhould he proceed to ſay that he weighed the *fleece of wooll* and not the *incumbent lead*: for as yet no diſcoveries have acquainted the world with the nature of that *Æther* which is above the *Atmoſphere*, whether it *gravitate* or *preſs* upon the *ſubjacent Air* (which a very *ſubtile* but *rapid body* may do) nor what effects the *Libration* of the *Moon* and other *Planets* may have by way of *preſſure* upon the *contiguous* bodies, which *preſſure* may be communicated to the *terreſtrial Air*: and without the determination hereof, it is as vain to pretend to *weigh the Air* by this *Barometer*, as to determine of the *weight* of a *board* that preſſeth a *Cheeſe* in the *Vat*, without conſidering the *ſuperincumbent* ſtone. Neither are we informed ſufficiently what the *Figure* of the *Æther* is, whether it make a *convexe* and ſo encompaſs the *Atmoſphear*; or *alſo* be interſperſed with, and *differently move* therein; nor what effects thoſe *motions* and *agitations* of it have upon the *groſſer* corpuſcles of the *Atmoſphere*, (not only in *abating* of their *gravity* ſomtimes, but adding to them a *levitation*: nor is it explicated yet what effects the *corpuſcular rays* of the *fixed Stars* and *Planets* may have *in* or upon the *Atmoſphere*, adding to its *gravity*, (as 'tis juſt to imagine, ſince that eminent *Virtuoſo*, the *Pliny* of our Age for lying, but a *Virtuoſo*! could waſh his *hands* in the *beams* of the *Moon*) or *Elaſticity*,

Thus the *Moon* according to the *Carteſians* by its preſſure upon the *waters*, cauſeth the Tides on *Earth*.

of which those *intercurrent* corpuscles seem not void (though not *Aiery*) which constitute *Thunder, Lightning, &c.* or diminishing them *both* in order to the *Phænomena*, which occurre daily.

Sir K. D. of Simp. p. 43. Charlton de fulmine.

Secondly, it doth not yet *appear* by any thing alledged by our *Experimental Philosophers*, that *for certain* the Air which encompasseth the *Earth* is a *distinct* body of a *different structure* from the *Earth* and *Water* that compose the *Terraqueous* Globe. *Isaac Vossius* doth think the *Air* to be nothing else but *watrish exhalations* drawn up by the *Sunne*.— "*Credi-*
"*mus Aerem esse Aquam seu humorem dilatatum, ad legem æ-*
"*quilibrii quaquaversum se extendentem.* If it be so, it is a *vain supposition* which attributes such a *structure* to the *Air*, as is repugnant to the *water*: Others there are which make the *Atmosphere* to be an *aggregate* of *heterogeneous particles* exhaled from this *Globe*, whose *structure* must be as *discrepant* as the *vapours* are: and what a difference there is in them we may guess by the *infinite variety* of *Meteors, Rains, Snows, Hail, Winds, Dews, &c.* and their *component corpuscles*. If this latter be true, (as 'tis probable that it is; at least that there is no more besides but an intercurrent *Æther* or *materia subtilis* of the *Cartesians*) what becomes of this *Elasticity*, or *pressure* of this *Springy Air* so much talked of?

Is. Voss de motu mar. & vent. c. 21 p. 94.

Aeris elementum juxta *sacra eloquia* nihil aliud est quam *humidi*: quædam perpetuò occuperantis subtilissimæ & spirabilis substantia. *Kircher.* Iter ecstat. 2 dial. 2. c. 3.

The *Air* seems nothing else but a kinde of *tincture* or *solution* of *terrestrial* and *aqueous* particles dissolved into the *Æther*, and agitated by it, just as the tincture of *Cochineel* is nothing but some finer *dissoluble* parts of that concrete lick'd up or *dissolved* by the *fluid* water. Mr. *Hook Microgr. obs 6. p. 13.* Atmosphæram *ex halitibus* terrestribus *& vaporibus* aqueis *actione* solis *&* reliquorum Astrorum *concitari, inter doctos convenit. Hanc eandem* Atmosphæram, *ob Solis &* reliquorum Astrorum *conversiones* variæ mutari *& attemperari apud eosdem* indubitatum *est.* Scheiner. *ros vagin l. 4. p. 2. c. 1.*

Thirdly, 'tis necessary to distinguish betwixt the *pressure* and *weight* of *bodies*: for, suppose were a man *pressed* under a *bended stick*, or other *springy body* compressed, he shall feel a *great oppression* upon him, and be *kept down* to his great pain, not with the *weight* but *spring* of the said *stick*, or other *springy body*: and whosoever by the violence of the *compression* would judge of the weight of the *incumbent* body, would expose himself to *laughter*.

Fourthly, 'tis possible for a body without any *springiness*

or

or *acceſſional gravity*, to preſs downwards above its *weight*: thus a *needle* touched with a *Loadſtone* declines from that line in which it hung parallel to the *Horizon*, without any addition of weight: which is demonſtrable from the variety of its *declination* and *reſtitution*: and 'tis as *indubitable* that ſuch *declination* of it carries with it ſomething of *preſſure*.

Acus omnino parallela horizonti, qua ſubito atque magneti affricatur, nullo modo fit gravior, tamen deprimitur, perinde ac ſi magnes eſſet acui ſubjectus. Finge nunc aliquem, qui hæc a magnete fieri neſciat, is profectò credet cum *Ariſtotele* acum tendere ad centrum mundi. *Berigard.* de *terra*: circulo 6. parr. 3.

Fifthly, we are to conſider the nature of the *Earth*, whether that be a *Magnet*, or no: for if it be *ſuch*, (however the *Magnetiſm* be explained, whether according to the *Carteſian* Hypotheſis, or that of *Berigardus*) inſtead of *weighing the Air*, we deceive our ſelves as *groſly* as if we took the impulſe with which *Iron* runs to the *Loadſtone* for its *weight*: and thus in ſome caſes we ſhall weigh things by *their aſcent*, which is inconſiſtent with the *common notion* of *weighing* things.

Sixthly, to wave the *uneſtabliſhed* notions of *Gravity* and *Lenity*, and to abſtract from all the *preceding conſiderations*, I ſay, that even ſo this opinion of the *Aerial Column preſſing down upon the Mercury* is falſe: ſince in a body ſo *unequally mixed* as the *Air* is often (and it cannot be diſproved that *'tis ever otherwiſe*) it is impoſſible to imagine that the *preſſure* or *gravitation* is by way of a *Column* or *Cylinder*. Imagine the *Experiment* to be tried by *ſix* or more *weights* preſſing at *one time* upon the *Mercury*, would any man *in his wits* ſay, that this *joint preſſure* were *cylindrical*? conſider but the variety of *mixtures* in the *Air*, (and the ſeparate *preſſures* that are *conſequential* thereunto) which the contemplation of the *clouds* will lead us into, and 'tis the ſame thing. Were a man *ſwimming* in that concourſe of water in *Hungary*, where the *unmixed rivers* flow in one *channel*, and his body ſo placed that part of it were in *one ſtream*, and part in *another*,) would you ſay that the *incumbent water* did preſs upon him in a *Column* or *Cylinder*? But to proceed further, if it be true that the ſuperiour part of the *Air* or *Atmoſphere*, which tranſcends the *mountainous aſperities of the Earth*, hath *another motion* or *lation* then that which is more *low*,

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(explain it either the *Ariſtotelian* way, or according to *Galilæo*, and agreeably to the *motion of the Earth*) if this be true, (as I take it to be now) how can we determine of the *Gravity* of the *neighbouring Air* by this *Experiment*? and how vain is this notion of a *Cylinder*? for in a *fluid* agitated with *different motions* as the ſubject *Air* is by *repercuſſion* from the *Hills* and *Plains*, (which begets *vibrations* and *undulations* God knows what it ſuffers upon the *generation* and *motions* of *Meteors*; and where the *ſuperior* part hath a *motion* different oftentimes from the *other*, of whoſe *rapidity* we are as uncertain as of its *ſtructure*, and *texture*, (and we ſee that the *rapidity* or *ſwift motion* of an *heavy body* takes it from its *preſſure* and *gravity*) how can any man talk of *Aerial columns*, much leſs pretend to weigh the *Air incumbent*, and to determine *exactly of any acceſſion of weight*, as M. *Glanvill* profeſſeth to do? Beſides, if *heavy bodies* do not *gravitate* in a *ſtreight line*, but deſcribe the *circumference of a Circle*, or ſome *ſuch line*, (as *new Philoſophers* hold in oppoſition to *Ariſtotle*) and if the *Atmoſphere* be to be reckon'd amongſt the *bodies* that *gravitate*, how can we imagine this *gravitation* to be performed by way of a *column* or *cylinder*? Moreover, this *Atmoſphere* can no way be conſidered to preſs *cylindrically*, if we conſider that in every part of it there are continual *exhalations*, and *ſmoke* aſcending through it, ſo that the *weight* of it muſt needs be *abated* by the *aſcent* of thoſe *vapors*: and what we *experiment* here is not the *weight* of the *Air* properly, but the *ſuper-ponderancy* or *over-weight* of it. The *Atmoſphere* ſeems to me conſtantly to reſemble a *Glaſs* in which *water* is poured on *wine*, and the *wine* is aſcending thorough each part of the *water indeterminately*; if it be thus, and that the *aſcending vapours* carry a *great force* with them, (which any man will grant who conſiders the *weight* of the *ſmoke*, in compariſon to what remains of the *wood* and *coal* that is burnt: and who *ſtatically* regards

Vide *Galilæum* ſyſtem. c. ſin dial. 4. pag. 326. edit. in 4to.

Vide *Galilæum* de ſyſtem. mundi dial. 2. pag. 119. edit. in 4to. Sectatoribus Copernici opus eſt dicere (quippe qui ponunt orbem magnum circulo ferri) motum *gravii* deorſum eſſe per lineam curvam vel inſtar *quadratricis* Nicomedis, vel *circulari* ut *Galilæus* contendit. *Scipio Claramont.* de univerſ. l. xij. c. 10.

Vide *Sanctorii* medic. ſtatic. Hanc *Aeris* conciliationem demonſtrat vel ipſa *ſaliva* ex alto demiſſa, quæ dilaceratur prope terram in quam conciliatus aer impingens ad *ſalivam* redit, eamque diſcerpit. *Berigard.* circ. *Piſar.* part. 3. circ. 6. de *terra*.

regards the *ſteams* tranſpiring from our *bodies*: and how that *ſpittle*, which in an *entire body* iſſues from our mouths, deſcends till near the ground it be *diſſipated* and *diſtended*) I cannot imagine how it can be ſaid that we *thus meaſure all the degrees of compreſſion in the Atmoſphere, and eſtimate exactly any acceſſion of weight which the Air receives from winds, clouds, or vapors.* To conclude, if the *Air* do thus preſs upon the *Mercury*, how comes it to paſs that there is no difference when the *Experiment* is tried in a *chamber* (where the incumbent *column* is leſs then *abroad*) and in the *open Air* of the *ſame levell*? Why doth it not *preſs up water* (or other *liquors*) in the like *Syphon* to an *heighth* as different as is the *diſproportion* betwixt the *gravity* of *Mercury* and *water*: which I have not heard it doth; yet the proportion betwixt *Mercury* and *water* in *gravity* is 1 ℔. 13½. In fine, how is that true which Mr. *Hooke* ſaith, *viz.*

Why doth not this *Cylinder* of *Air* which ſo preſſeth upon the *Mercury*, depreſs a *leaf* of *Gold*, but ſuffers it to flie up and down?

" That *he contrived an inſtrument to ſhew all the minute-varia-*
" *tions* in the preſſure of the Air: *by which he conſtantly found,*
"*that before and during the time of* rainy weather, *the preſſure*
" *of the Air* is leſs, *and in* dry weather, *but eſpecially when an*
" Eaſtern winde, (*which having paſt over vaſt tracts of Land,*
" *is heavy with* earthy *particles*) *blows, it is* much more:
" *though theſe changes are varied according to very odd Laws.*

Mr. *Hooke* in the Preface to his *Micrography*.

If this be true, (as I am apt to believe it is) with what face can our *Virtuoſo* tell us, " It is concluded, that ſuch a *Cylin-*
" *der* of the *Air* as *preſſes* upon the *Mercury* in the *veſſel*, is
" of *equal weight* to about 29 *digits* of that *ponderous body* in
" the *Tube*. Thus it is when the *Air* is in its *ordinary temper*:
" but *vapours*, *winds* and *clouds* alter the *Standard*, ſo that
" the *Quickſilver* ſomtimes *falls*, ſom-
" times *riſes* in the *Glaſs*, proportion-
" ably to the *greater* or *leſs acceſſion* of
" *gravity* and *compreſſion* the Air hath
" received from any of thoſe *alterati-*
" *ons*: and the *degree* of *increaſe* beyond
" the *Standard*, is the *meaſure* of the
" *additional gravity*. Is not this pret-

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If you would ſee how true Mr *Glanvill* ſpeaks, reade Mr. *Boyle* his eighteenth Experiment, and the defence of it againſt *Linus*: there you will finde that the *Mercurial Cylinder* did in winter ſomtimes correſpond with the *weather Glaſs* and ſomtimes vary: and the reaſon Mr. *Boyle* gives, is ſuch as takes off from the certainty of Mr. *Glanvill's* CONCLUSION.

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tily ſaid by a man that writes *a year* after Mr. *Hook*, and more after Mr. *Boyle*? How unacquainted is *He* and his *Aſſiſtants*, even with the *Writings* of their fellow-*Virtuoſi*? And if we may be allowed to transfer the *Fool's Cap* from the *Ancients* for *concluding too ſoon*, may we not *crown* the heads of our *Virtuoſi* now therewith? And how careful the *R.S.* is in making good their promiſe to *Olaus Borrichius*, that what *their Members* ſhould write, the whole *Society* would be reſponſible, let any man judge that conſiders how Mr. *Hooke*, and Mr. *Glanvill* (I beg Mr. *Hook*'s pardon for the *unequal* compariſon) diſagree; and Dr. *Henſhaw* (another *Virtuoſo*) differs alſo from Mr. *Glanvill*, ſaying, That *the Quickſilver Tube will not give ſo exact an account of every ſmall difference in the preſſing Air, as the* THERMOMETER! what *confuſion* ſhall we be reduced unto *in time*, ſhould theſe *contradictious Experimentators* proceed as they have done! I ſhall here adde, that I do conceive that this *notion* of an *Aerial column gravitating* upon the *Earth*, or ſubjacent body, was framed in imitation of the *Hypotheſis* of *Simon Stevinus*, the Teacher of *Mathematicks* to Grave *Maurice* of *Naſſau*, in his fourth book of *Hydroſtaticks*, where he inſiſts much upon this *Aqueous Column*; but 'tis obſervable that that *judicious* perſon, the better to make out his *Theoremes*, preſuppoſeth ſuch things as give ſome repute to my objections about the *Aerial Cylinder* or *Column*, viz.

1. *Aquam omnibus partibus eſſe ponderitatis Homogeneæ.*

2. *Cujuſvis aquæ ſuperficiem planam & horizonti parallelam eſſe.*

3. *Aquæ fundo horizonti parallelo tantum inſidet pondus, quantum eſt Aqueæ Columnæ cujus baſis fundo, altitudo perpendiculari ab aquæ ſuperficie ſummæ adimam demiſſæ ſit æqualis.*

Out of this laſt *Propoſition*, and the *demonſtration* and *conſectaries* thereof in *him*; 'tis manifeſt, that he ſuppoſed not one of *his* aſſertions would hold (though the *Phænomena* were the ſame in *nature*) as he *worded* and explained *them*, if

if that he did not free his *aqueous Column* from any *oblique pressures*, and make it *rectangular*. And as for his *Postulatum*, that the *surface* of the water is *plain*, flat and *level*; he confesses it is not so *really*, viz. *Quatenus pars est sphæricæ sive mundanæ superficiei; mundanam autem superficiem dicimus sphæræ cujusvis mundo concentricæ*: he only professeth to assume it as *true*, because in *hydrostatics*, things happen as if it really were so; whereupon he scruples not to make use of a *supposition*, which is *really*, *confessedly*, and *demonstrably false*, as long as it conduceth to *practice*, and serves his turn as if it were *true*, without pursuing a more *tedious*, and not *more useful* Hypothesis agreeable to *Archimedes*. Which I take notice of by way of *Apology* for my self, and those who think fit to *acquiesce* in, or not to *blame* such *Methods* as are *effectual*, though otherwise *vain* and *groundless*. Another thing is, that *He* supposeth *there* that the *Earth* is the *Center of the world*. Out of all which I am more and more satisfied of the validity of my former doubts against this *so much concluded upon* Aerial Column, to the explanation whereof I finde no such *cautions*, or *previous suppositions* used, to take off the edge and force of such objections: neither indeed have I yet met with any thing of *that subject* proposed in a *Scientifical way*; and therefore much how it comes to be *concluded upon* so as Mr. *Glanvill* represents it to be.

§ Stevinus *hydrostat. Elem. l.* 4 *Theorem* 8.

Id. ib. postulat. 6.

Id. ib. postul. 7 *Et profecto tam receptum fuerit hæc ipsa non admittere, quam postulantibus Astrologis terram esse mundi centrum, fidem derogare.*

Whereas I have said, that the *gravitation of the Air* (even *Elementary*) is an opinion of *Aristotles*, and that *his* Experiment was tried by *Claramontius*; I adde, that the *verity* of that *trial* (though indeed it extend only to the *impure Atmosphere*) is attested by *Ricciolus* in these words, "*Duo* "*quarto* Aquam, & Aerem *nostrum habere aliquid levitatis* "*gravitati admistum, ut vitillius adscendant, ut sint supra id* "*quod est ipsis gravius; & vi hujus descendant. Hinc fit ut* "*folles lusorii, & Aere addensato bene inflati, etiam sine fari-* "*nulæ ac vim infusione, plus ponderent, quam flaccidi: ut ex-* "*quisita trutina deprehendes: immo ego expendi vesicam bo-* "*vinam, quæ flaccida erat scrupulorum* 4. *& granorum quatuor,* "*esse inflatam scrup.* 4. *grav.* 6. *quære Aer additus per infla-* "*tionem appendebat grana duo.* Thus the incomparable

Ricciol. *Almagnov. l.* 2. *c.* 5 *sect.* 4.

Ricciolus, whom I may as well reckon amongst the *Peripateticks*, as Mr. (*a*) *Boyle* doth *Schottus*: and how true that *Aristotelean* Experiment is Mr. *Boyle* demonstrates in his (*b*) *pneumatick discourses*. And though the works of *Galilæo*, *Kepler*, *Mersennus*, *Gassendus*, *Pecquetus*, *Paschal*, were lost, and were as ignorant as some *Virtuosi* of their *trials* about the *weight* of the *Air*; yet would not the *Assertion* have seemed so *strange* and *incredible* as Mr. *Glanvill* represents it to be; for though *Maynenus* deny it, yet he brings in this Objection. "*Aer est gravis, &c. go. probatur primo* "*a* Mathematicis, *qui de* Aeris pondere *scripserunt, invene-* "*runtque ejus ponderis momenta.* 2. A Francisco Mendoza, "*qui in suo viridario problema instituit*, An in Aere navigari "possit? 3. *A descensu lapidum & aliorum gravium, quæ* "*Aeris pondere prægrammata urgent suum descensum, & veloci-* "*us in fine quam in principio moventur.* 4. *Experimento ad-* "*ducto a* Bassone, *qui follem inflatum citius descendere ait* "*quam Aere vacuum, ob additum* Aeris pondus. l. de motu. in- "tent. 1. art. 3. *Berigardus* also asserts the *gravity of the Air*, and justifies it by this *Barometer*, and the *unequal* ascent of the *Mercury* on the *top*, and at the *foot of a mountain*. I shall summe up all, that may take off from the *novelty* of the thing, and deprive the R.S. of the *glory* of *pretending* to any *interest* in the *discovery* in the words of *Thomas Bartholinus* de pulmon. sect. 3. p. 60. "*Ingeniosus* Sanctorius *in in-* "*veniendis instrumentis* Medicis, *inter alia Com. in* 1 *Fen.* A- "vic. *Stateram ponit, qua ventorum vim & impetum ponde-* "*rat. Inventis aliquid addam. Vitream phialam lanci nostræ* "*impone, & leni halitu inflato videbis quam parum ponderi ac-* "*creverit. In instrumento* Magdeburgico *testatur* Otho Ge- "riche *Consul* Magdeburgensis *& inventor ejus*, ponderari "posse Aerem *hoc pacto*; *quanto levius est vitrum post* Aerem "*extractum, tantum ponderabat* Aer *antea in eo contentus. Varios* "*modos alios* Aeris levitatem *bilance expendendi tradit* Caspar "Ens *Thaumat. Mathemat. Probl.* 93. *c.* 15. *Vesicam bovinam* "*se expendisse ait* Joannes Bapt. Ricciolus *Tom.* 1. *Almag.* "*nov. l.* 2. *c.* 5. *num.* 4. *quæ flaccida erat scrupulorum quatuor &* "*granorum quatuor*: *& deprehendisse eandem inflatum scrupu-*

lorum

a Against *Hobs* c. 3.

b Experiments of Air. Exper. 6. and against *Hobs* c. 3.

Democrit. revivisc disp. 1. c. 3. p. 34. in 4to.

Circul. *Pisan.* part. 6. circ. 7. de nutritione.

☞ Sanctorius *was a* Galenist.

" *lorum* 4. & *granorum* 6. Marcius Merſennus *in Phænom.* " *Propoſ.* 29. *aſſerit ſe Geometris præſentibus & adjuvantibus* " *ponderaſſe bilance Æolipilam æneam ſatis calefactam, &* " *propemodum candentem, omnique humore deſtitutam & quam* " *minimum Aeris continentem; deprehendiſſeque pondus fu-* " *iſſe unciarum quatuor, drachmarum* 6. & *granorum* 15. " *poſtquam vero naturaliter refrixiſſet Æolipila, & Aer an-* " *tea rarefactus rediiſſet ad priſtinum ac naturalem ſuum ſta-* " *tum, iterum ponderaſſe ipſam, & inveniſſe pondus præcedente* " *pondere majus fuiſſe quatuor gravis. Plura in hanc rem con-* " *geſſit. cl.* Caſp. Schottus *in Mechan. p.* 1. *protheor.* 4. " *e.* 6.

I have not *Schottus* by me at preſent; neither is there need of any *further Inquiries*; for *I* have ſufficiently demonſtrated that the *Gravitation of the Air* is an opinion of *Ariſtotle*, *Averroes*, and other *Peripateticks*, though not *generally* received by *that ſort of Peiloſophers*: and that it was *truly* and *experimentally* demonſtrated by *them*, eſpecially as far as the *Atmoſphear* is concerned in the *Queſtion*. *I* have alſo made it *apparent*, that the *Barometer*, or *Mercurial Experiment* doth not diſcover the *weight of the Air* with any certainty; much leſs, *all the degrees of it*: That the *preſſure of the Air* is not by way of a *Cylinder* or *Column*; and that the *Barometer* had not its *original* but *denomination* from the *R.S.* they were, as I may term them, the *God-fathers*, not *Parents*. The *World* may juſtly *ſay* of the Honourable Mr. *Boyle*, that *he* hath improved the *Experiments* of his *Predeceſſors*, and repreſented them more *accurately*; and of Mr. *Glanvill* and *his Aſſiſtants what it pleaſeth*.

In the marginal note (*page* 15.) where I ſay, that *perhaps it is not true that* Ariſtotle *had any hand in, or was privy to the impoiſoning of* Alexander; *I* adde that *Pauſanias* after he had ſpoke of the *Stygian* water, and its *ſtrange property*, doubts whether *Alexander* were made away by ſuch *means*, or no: Σαφῶς μὲν οὐκ οἶδα· λεγόμενον δὲ οἶδα.. This *he* ſays (in *Arcadic*) without reflecting any way upon *Ariſtotle* as one concerned in the report. And *Arrianus* who writ the life of *Alexander*, out of the *Memoires* of *Ptolomæus Lagides*

(who was preſent when that great *Prince* died) avows, that *he died of a ſurfet*: yet he relates ſundry *rumors* about his death, one whereof is, that *Ariſtotle* (being fearful of *Alexander* after the death of *Caliſthenes*) ſhould prepare the poiſon for *Antipater*, to be ſent him: but concludes thus, Ἀλλ' ταῦτα ἐμοὶ, ὡς μὴ ἀγνοεῖν δόξαιμι μᾶλλον ὅτι λεγόμενά ἐστιν, ἢ ὡς πιστὰ ἐς ἀφήσιν ἀναγεγραφῶς. *Arrian.* de expedit. *Alexandr. l.* 7.

Whereas I reflect (*page* 16.) upon that paſſage of *Plato*, Ὁ Θεὸς γεωμετρεῖ, and what Mr. *Glanvill* ſaith, "*That* "*without* Geometry *we cannot in any good degree underſtand* "*the Artifice of the Omniſcient Architect in the compoſure of* "*the great World and* our ſelves: *and that the Univerſe muſt* "*be known by the Art whereby it was made.*——— There ſhould have been a *Chaſme* made for ſome paſſages, I know not why omitted. I adde therefore, that it is not *revealed* unto us that God made the *Univerſe* according to that *Art*, and it ſeems an Additional to the firſt *Fiat*, or *let there be*—— in *Geneſis*, to ſay his commands were regulated by the rules of *Geometry*, and his *powerful* and *omnipotent* word confined thereunto. Had Mr. *Glanvill* been pleaſed to conſult the *fathers*, he would have found that this *Tenet* of his is no *primitive* notion: and that particularly *Euſebius* hath refuted it, denying that God in his Works is obliged to *Geometrical* numbers; and that *Socrates* (whoſe authority is greater then *Plato*'s) did place *no great value on thoſe Sciences*: that the firſt *Chriſtians* did ſlight the knowledge of *them* as uſeleſs to *Piety* and *knowledge of God*; becauſe my opinion about theſe things is agreeable to that of the firſt *Chriſtians*, and of *Socrates*; I ſhall inſert the whole paſſage, as it is tranſlated into *Latine* in the *Paris* Edition.

Mr. Glanvill *p.* 25.

Euſeb. de præp. Evang. l. 14 c. 4.

Euſeb. præp. Evangelicæ l. 14. *c.* 10, 11. edit. *Paris.* 1628.

Primum tamen quoniam *Mathematica* illa *ſua* tantopere jactare ſolent, prorſusque *neceſſarium* eſſe dictitant, ut quiſquis comprehendendi veri ſtudio tenebitur, *Aſtronomiam*, *Arithmetriam*, *Geometriam*, *Muſicam*, illa nimirum ipſa, quæ ad eos a *Barbaris* profecta eſſe jam oſtendimus, perſequatur:

quatur: (his enim qui carebit, *doctum perfectumque Philoſophum* eſſe neminem, imo rerum veritatem ne primoribus quidem labris diguſtare poſſe, niſi qui *harum* ante rerum animo cognitionem impreſſerit:) deinde hanc ſuarum artium peritiam magnificentius oſtentantes, æthere ſeſe medio *ſublimies* propemodum incidere, *numeriſque ſuis* ipſum quoque *Deum* circumferre arbitrantur: nos vero *qui ſimilium diſciplinarum amore non flagremus*, nihil a *pecudibus* abeſſe exiſtimant, *deique* propterea nunquàm nunquam *rei paulo gravioris notitiam percepturos* eſſe pronunciant: Age, hoc ipſum quam pravum ſit atque diſtortum, vera laminis loco ratione propoſita, ſic tanquam ad libellam & regulam exigamus. Erit ea quidem ejuſmodi, quæ Græcos, innumerabiles, infinitoſque Barbaros complexa; alios tametſi *his artibus* doctriniſque paratos, nec *Deum* unquam, nec *honeſtæ vitæ rationes*, nec omnino præclarum & *utile* quid percepiſſe; alios, ut ab omnium diſciplinarum ſtudio deſtituti eſſent, *religioſiſſimos* tamen ac *ſapientiſſimos* extitiſſe demonſtret. Enimvero quænam hoc in genere *Socratis* illius, qui ab iſtis omnibus tantopere celebratur, ſententia fuerit, e *Xenophonte* intelliges, ſi modo ei ſuis in *Memorabilibus* hæc ſcribente fidem adhibebis.

"Docebat, *inquit ille*, præterea, quatenus cujuſque rei "peritum eſſe hominem *bene inſtitute* oporteret: principio "*Geometricæ* dandam eatenus operam eſſe dicebat, ut ſi- "quando res paſceret, dimenſam rite terram vel accipere ab "alio, vel alii tradere, vel eam dividere, vel opus aliquod de- "ſignare poſſet. Id porro tam eſſe ad diſcendum facile, ut "qui dimenſionem attendere voluerit, idem ſimul & quanta "ſit terræ magnitudo aſſequi poſſit, & quænam ejus metien- "dæ ratio breviter admodum expediteque cognoſcere. At "ejuſdem in *Geometricæ* ſtudio, ad illas uſque deſcriptiones "intellectu difficiliores quenquam progredi, *Socrati* non "placebat. *Cui* enim *bono* futuræ illæ eſſent, videre ſe, ta- "metſi ne illarum quidem imperitus eſſet, rogabat. Enim- "vero, ad exhauriendam hominis vitam cum ſatis illas eſſe, "tum aliarum interim & plurimum & *utiliorum doctrinarum* ſtudia impedire. *Aſtronomiam* ſimiliter eatenus com-

plecti

" plecti ſolum jubebat, ut *noctis, menſis, annique tempora*
" cognoſceres, atque hujus cognitionis ope, ſiquando vel
" iter, vel navigatio ſuſcipienda eſſet, vel agendæ forent ex-
" cubiæ, vel in aliud quidlibet quod noctis, menſis, annique
" ſpatio fieri ſolet, incumbendum, ſignis ad ea omnia ſuis
" quæque temporibus obeunda, certioribus uterere. Atqui
" hæc nihilo difficilius tam ex nocturnis venatoribus, quam
" ex navium gubernatoribus, & aliis quamplurimis reſciri
" poſſe, a quibus eorum peritiam ſuæ cujuſque partes offi-
" ciumque depoſcat. At *eandem artem* eo uſque perſequi,
" dum ea quæ non eodem motu circumferantur, ſtellaſque
" ſimul errantes & vagas diſtinguere noveris, adeoque in ea-
" rum abs terra intervallis, converſionibus cauſisque riman-
" dis ætatem vireſque conſumere, id vero graviter imprimis
" ac ſerio prohibebat, quod *multum hujus* etiam *opere pretium*
" videret, tametſi ne in iſtis quidem rebus hoſpes ipſe
" ac peregrinus eſſet. Addebat, conficiendæ hominis vitæ
" illas quæque ſatis futuras, quæ interim a pluribus *utilioribusque ſtudiis* avocarent. Poſtremo quibus *cœleſtia* quæ-
" que rationibus *Numen* moderetur, inveſtigari nolebat,
" quod cum eo ab hominibus aſpirari non poſſe, tum minus
" cum diis probari exiſtimaret, qui quæ prompta notaque
" eſſe noluiſſent, inquireret. Nec minus illi, quem ea ve-
" hementius cura deſtineret, *inſaniæ periculum* imminere di-
" cebat, quam *Anaxagoræ*, qui explicatus a ſe *deorum Machinas* tantopere gloriabatur.

I ſhall adde, that if *God Almighty* be regulated by the rules of *Geometry*, and *mechanical motion* in the management of this *world*, and that the *fabrick* of things is *neceſſarily* eſtabliſhed upon *thoſe Hypotheſes*, I cannot any way comprehend how *God* can do any *miracles*: how the *Sun* ſhould *ſtand ſtill* at the command of *Joſhuah*, or the *ſhadow* go back on the dial of *Ahaz*: or how there could be a *general deluge*; or ſuch an *Eclipſe* as is related at the death of our *Saviour*: or that the fire ſhould not *burn*, or deſtroy the *three children*: in *which*, and *other caſes*, if *God* were not tied up to this *Art*, I do want proof (till *he declare* it) that *at other times* he acts *altogether* agreeably *to it*. This opinion

nion of mine hath been hitherto the moſt *Chriſtian* Aſſertion, and held moſt conſonant to *Piety*, and hath been amply maintained of late by Dr. *Henry More*, in oppoſition to what the *Royal Society* lays down in their Hiſtory; "*That* Gene-
"ration, Corruption, *Alteration*, *and*
"*all the viciſſitudes of* Nature, *are nothing*
"*elſe but the effects ariſing from the meet-*
"*ing of little bodies, of* differing figures,
"magnitudes *and* velocities. *Then which* opinion *there can be nothing more* peſtilent *and* pernicious; *and Dr.* More, albeit a *Member* of *this Society* heretofore, (for he allows nothing to it now) yet a *pious* one, profeſſeth that this *Mechanical Philoſophy* doth incline to *Atheiſm*: neither would he approve of thoſe *deductions* as *neceſſary*, but *ridiculous*, when I upbraided him *lately* with that *non-ſenſical* and *illiterate* Hiſtory, Mr. *Sprat p.* 348. "'*Tis true*,
"*his*, [viz. The Experimental Philo-
"ſophers] employment *is about* materi-
"al things. *But this is ſo far from*
"*drawing him to oppoſe inviſible* Beings,
"*that it rather puts his thoughts into an*
"*excellent good capacity to believe them.*
"*In every* work *of* Nature *that he handles, he knows that*
"*there is not only a* groſs ſubſtance, *which preſents it ſelf*
"*to all mens Eyes; but an infinite ſubtilty of* parts, *which*
"*come not into the ſharpeſt ſenſe. So that what the* Scri-
"pture *relates of the purity of* God, *of the* ſpirituality *of*
"*his* Nature, *and that of* Angels, *and the* ſouls *of men*,
"*cannot ſeem incredible to him, when he perceives the*
"*numberleſs particles that move in every mans* Blood, *and*
"*the prodigious ſtreams that continually flow unſeen from every*
"body: *having found that his own* ſenſes *have been ſo far aſ-*
"*ſiſted by the* Inſtruments *of* Art, *he may ſooner admit that*
"*his minde ought to be raiſed higher by an Heavenly light,*

Mr. *Sprat pag.* 312.

I wonder that *ſuch effects* ſhould be attributed by *them* to the bare *concourſe* and *meeting* of *corpuſcles* of *differing figures, magnitudes* and *velocities*; without taking notice of that *alteration* of *texture*, and of the *figures* of *the concurrent particles*, without which *Carteſianiſm*, nor the other *Mechanical Philoſophies* can ſubſiſt: and not ſo without allowing the conſtant aſſiſtance of *God*, *directing* and ordering lay-*Mechaniſm*. So *des Cartes* Princ. Philoſ part. 2. *Deus materiam ſimul cum motu & quiete in principio creavit; jamque per Solem ſuum concurſum ordinarium tantundem motus & quietis in ea tota, quantum tunc poſuit conſervat.* Oh! *rare* and *ſenſible* explication of things! God Almighty in a *peculiar matter agitates matter!* muſt we thus explain the *ſecondary* and *mediate creation* of the world in *ſix days*, whereas the *like productions* have not happened in ſo many *thouſand years* as are lapſed ſince! Beſides, whatever our *Virtuoſo* thinks of the *Eternal Generation* and *Incarnation* of the Son of God; *He* doth not except in this Aſſertion the *Generation* of *mankinde* in the ordinary and *natural* way.

in

" in those things wherein his *senses* do fall short. If (as the " Apostle says) the invisible things of *God* are manifested " by the visible: then how much stronger Arguments has " he for his belief, in the *eternal Power* and *Godhead*, from " the vast number of creatures that are invisible to others, " but are exposed to his view by the help of his *Experi-* " *ments*? My *censure* upon this place is, that if his *Experimentator* have any skill in *Logick* or the *ways of arguing*, though from the *Rules of Mechanism*, and the *contemplation of visible bodies*, he may proceed to the allowance of *invisible* and *insensible corpuscles*, yet shall he still confine his *progress* and *ascent* within the nature of *matter* and *corpuscles*, and never apprehend (upon those grounds) the *being* and *operations* of an *immaterial, omnipresent Deity* acting by the *Word of his Power* and *Will*: nor the *incorporeal nature* of the *soul of man*. Such a *Transition ad genus a genere*, or μετάβασις εἰς ἄλλο γένος, he that owns those *principles* cannot assent unto, if he understands himself, and argue not so as to alledge,

One *Proposition* for *sence*,
The *other* for *convenience*.

Where I speak of *Archytas* (pag. 18.) that he was a *practical* and *Mechanical* Philosopher, contrary to what Mr. *Glanvill* asserts (*pag.* 27.) I shall adde his life; As it is " briefly written in *Ricciolus* thus. " *Archytas Tarentinus* " *Pythagoreus nobilis, Mathematicarum peritissimus, quem ut* " *una cum* Timæo *cognosceret* Plato, *in* Italiam *navigavit, ut* " *ait* Cicero. *In* Mechanicis *excelluit, & vi illarum quin-* " *quies vicit hostes in prælio, ut nihil dicam de columba lignea,* " *quam libramentis ad violatum compulit; sed in Cosmogra-* " *phia at* Geometria practica *excelluisse indicat illud* Horatii " lib. 1. odorum.

Ricciolus *in Chronic part.* 2. *præfixo ad Almag. fl. nov. in* Archytas.

Te maris ac terræ numeroque carentis arenæ,
Mensorem cohibent Archyta.

Neither

Neither is Mr. *Glanvill* mistaken there in reference to *Archytas* only: what he saith about *Eudoxus Gnidius* is false: who was a *Mechanician* also, and amongst other discoveries, "*Invenit etiam Arachnen, horologium videlicet su-*"*lare, in quo linea horarie, & arcus signorum in modum aranee*"*se secant.* Blanoan. in Chronol. Mathemat. Sevil. 5.

Blancanus saith of *Archytas*, that *he was Mechanica Inventor*, in Chronol. mathem. secul. 5. And *Willi. Snellius* in his Preface to the *Hypomn. mathem.* of *S. Stevinus*, doth reckon upon *Archytas* and *Eudoxus* as eminent for *practical Mechanicks*.

Whereas I say (*page* 22.) that the *Royal Society* were not the first that applied themselves to the observing the *formes of Animals*, &c. by the *Microscope*: I adde that *Zucchius* did not only *precede* them in the attempt, but seems to have had *better glasses* to that purpose then they: for whereas Mr. *Hooke* in his description of a *Flea* says of the *Eyes* only this, that *the head is on either side beautified with a quick and round black eye*: the more accurate *Zucchius* saith, "*Novissime Microscopio parato ab excellentissimo Vi-*"*rorum in omnes formas ad propositos usus formatore D. Eu-*"*stachio Divinio Septempedano, spectavi meis oculis senescen-*"*tibus* Oculum pulicis, *distinctis in eo albescente* Sclerotide "*a* Cornea, *& per corneam* Iride *oculi.* And in the description of the *feet* of a *Fly*, and the *feather* of a *Peacock*, I observe that there is such a *difference* betwixt those *two Writers*, that as *one* of them must needs be in an errour, so I am apt to think that our *Virtuoso* is the person: see Mr. *Hooke p.*167,168,169,170. and *Zucchius* Philos. opt. parv. 2. trac. c.7. sect. 4. pag. 349,350. If *England* do yield better *Microscopes* then those of *Eustachius Divinius*, then I am ready to change my judgement.

Mr. *Hook* micrograph. p. 210. *Zucchius* philos. opt. pars 2. cap. 2. sect. 2. p. 39.

Where Mr. *Glanvill* speaks of going to the *World of the Moon*, and I animadvert upon the difficulties of the *journey*, and that his *lodging* will be too *hot* for him; adde in the Text these words *page* 43.

Besides the other difficulties of the *journey*, 'tis further considerable, that from the *Centre* of the Earth to the Moon, according to the calculation of *Tycho Brahe*, there is near 56 *semidiameters of the Earth*, which is about 192416 miles: and admit it be supposed that Mr. *Glanvill* flie 20 miles every day in ascending towards that *world*, he should be above 15 *years* before he could come to the Orbe of the Moon.

Van. Etten Mathem recreations pag. 210,221.

Where I ſpeak againſt the accommodating of *Scripture* to *common railing*, p. 49. I adde, that not only the *Council* of *Trent* (— *fas eſt & ab hoſte doceri*) hath prohibited *Seſſ.* 4. that *any* ſhould apply the *holy* Scripture *ad ſcurritia, fabuloſa, vana, adulationes*; but alſo that the firſt *Council* at *Millain*, forbids the uſing it *ad jocum, oſtentationem, contumeliam, ſuperſtitionem, impietatem*. And, to upbraid our *Divine*-Railleurs a little more, an ancient *African*-Council decrees, *Si Clericus, aut Monachus verba ſcurritia, joculatoria riſumque moventia loquitur, acerrime corripiatur*. The words of which *Canon*, (viz. *Scurritia & joculatoria*) are by a learned *Frenchman* rendred *raillery*. —— "*Nous avons le Canon d' un ancient Concile d' Afrique, qui parle en ces termes*: Si quelqu' un du "Clerge ou ſi un Religieuſe dit des paroles de raillerie, des "choſes plaiſantes & enjouees, qu' il ſoit chaſtie tres ſevere- "ment. *Qu' euſſent dit a voſtre avis ces bons Peres ſi ces rail-* "*leries euſſent eſte terees de l' Eſcriture*? This Queſtion hath been agitated with much wit and addreſs in *French*, betwixt Mr. *de Girac* and Mr. *Goſtar* in ſundry books, wherein any man of *common reaſon and piety*, will give the advantage to adverſary of *Voiture*, who is juſtified by the concurrent opinion of *Balzac* in his remarks *ſur les deux ſonnets*: and to theſe Writers I refer our *Virtuoſi*, ſuch as reckon upon all *other learning* as *Pedantry*, may inform themſelves thence as out of Writers which tranſcend not *their breeding* and *ſtudies*.

Whereas (*pag.* 58.) I ſpeak ſomewhat in commendation of the ancient *Ariſtotelean* Monks, I finde that their *eſteem* is much advanced by the learned *Gabriel Naudæus* in theſe words. "*After the laſt taking of* Conſtantinople, *Learning* "*began to creep out of* Monaſteries, *which for all the time before* "*had been* (*as it were*) *publike* Chriſtian Schools, *where not* "*only* youth, *but alſo ſuch* men *as would apply themſelves that* "*way, were inſtructed in all manner of* Diſciplines, Sciences, "*and* Morality, *and that to ſuch an height, that not content with* "*that ſo famous* Quadrivium *of the* Mathematicks, *which*, "*beſides all that is now ſhewn in* Colledges, *was then taught*, "Medicine *both as to* Theory *and* Practice, *was ſo well cul-* "*vated, that we need no more to convince us how expert they* "*were therein, then the Writings of* Ægidius, Conſtantine,

Gabr. Naudæus Hiſt. of Magick c. 7.

and

" *and* Damaſcene, Joannitius, Peter *of* Spain, *and* Turiſa-
" nus. *So that it were eaſie for me to anſwer them who charge them with* illiterature *and* ignorance.

Where I ſpeak out of *G. Hofman* and others, that it is ſufficient for a *Phyſician* that he proceed upon ſuch rules and *methods* as may moſt *commodiouſly* guide him in his *practice*, without being ſolicitous whether they be *rigorouſly* and *philoſophically* true: *pag.* 75. I adde, that there are others as eminent as any that ever pretended *to cure*, which concurre with me in this opinion. As *Avicenna* and *Riolanus*; the words of the latter in his *Examen* of *Harvey*, *c.* 9. are theſe.
" — *Quapropter cum* Avicenna doctr. 6. cap. *diſtinguo ſermo-*
" *nem* utilem a vero; *Medicus* qua Medicus, inquit ille, *non*
" *curat, quid in* veritate *ſit, ſed contentus eſt Phænomenis qui-*
" *buſdam, quæ ſunt ſatis illi* in curatione *morborum.*

I adde unto the paſſages (*pag.* 97.) which relate unto the diligence of the *Ancients* in *Diſſections*, this: That the *Ancients*, and particularly the *Peripateticks* were very *curious* and inquiſitive into *Anatomy* appears by this paſſage out of *Chalcidius*, in his diſcourſe upon the *Timæus* of *Plato*; he lived about *one thouſand one hundred and ſeventy years* ago, and the paſſage (which relates to the *Platonick* notion about viſion) in the *Latin* Edition of *Meurſius*, (*pag.* 340) runs thus. *Quare faciendum ut ad certam explorationem Platonici dogmatis* commentum vetus *advocetur* medicorum, & *item* Phyſicorum, *illuſtrium ſane virorum, qui, ad comprehendendam ſanæ naturæ ſolertiam*, actus humani corporis, facta membrorum exſectione, rimati ſunt: *qui exiſtimabant, ita demum ſe ſuſpicionibus, atque opinionibus certiores futuros, ſi tam* rationi viſus, *quam* viſui ratio *concineret. Demonſtranda igitur oculi natura eſt: de qua cum* plerique alii, *tum* Alcmæus Crotonienſis, *in Phyſicis exercitatus, quique primus* exſectionem *aggredi eſt auſus*; & Calliſthenes, Ariſtotelis auditor; & Herophilus, *multa*, & *præclara in lucem protulerunt.* Out of which it is manifeſt that the *Ancients* (eſpecially the *Ariſtotelians*; for ſuch were *Caliſthenes* and *Herophilus*) did with ſome curioſity examine the *Phænomena* of *nature*, and *regulated* their *opinions* by *ſenſible experiments*; and that this was the *practice* of moſt of the eminent *Phyſicians* and *Naturaliſts* of old.

The Letter of *Hippocrates* to *Damagetas* mentioned *pag.* 89. (though cited as *genuine* by *Galen*) is ſuſpected by *Jo. Baptiſta Cartes.* miſcell. medic. dec. 1. c. 4. "*Cæterum & hæc* "*Epiſtola, quæ ſub nomine* Hippocratis *circumfertur, ſuſpecta* "*eſt mihi, primum quia* Diogenes Laertius *lib. 9. in vita* De- "mocriti *ſcribit illum nequaquam* ridentem, *quanquam con-* "*cedat ab* Hippocrate *fuiſſe viſitatum* (non quidem ut ipſum "ſanaret) *quo tempore jam* Democritus *erat* decrepitus, *nec* "*amplius aptus ſectioni cadaverum*: *nam* Hippocrates 436 "*annos ante* Chriſtum *natus*; Democritus *vero* 492 *ita ut* "*ita ut* Democritum *nativitate ſecutus ſit* Hippocrates 56 "*annis*: *& tum ſive ad videndum, ſive ad ſanandum eum con-* "*veniret, vigeſimum quintum annum attigiſſe veriſimile vide-* "*tur*: *cum tunc temporis* Hippocrates *medici famam adeptus* "*eſſet, quod non poterat niſi per longum temporis curſum &* "*varia experimenta in Medicina facta ſibi comparare.* — *Sed* "*probandam provectiorem* Hippocratis *ætatem, & majorem* "*ſenectam* Democriti, *ejuſdem* Laertii *teſtimonium extat di-* "*centis*; *Ultimum, quod in vita* Democriti *legitur dictum,* "*aut factum, fuiſſe illam cum* Hippocrate *collocutionem*: *at-* "*que annum agentem* 109. *ab hujus vitæ Statione deceſſiſſe.* *I finde alſo that* Menagius *ſuſpects thoſe* Letters, *though he con-* *Menag. in Diog. Laert. l. 9. p. 238.* *feſs them to be very ancient.* *Extant hodie* Hippocratis *de ſua ad* Democritum *profectione* Epiſtolæ, *ſed* ſuppoſititiæ, *licet* perantiquæ.

Whereas *I* ſay *pag.* 114. that I have obſerved in *ſome* that their *pulſes* have ſuffered no *alteration*, at leaſt kept no *time*, or *palpitated* as did their hearts. I ſhall illuſtrate this with an obſervation in a young Lady, which I had too fatal an opportunity lately to make: ſhe died of a very *malignant Feaver* joyned with the *Meaſils*: two nights before *ſhe* died I watched with her, and frequently *obſerving* the *variety* of her *pulſe*, I determined to minde whether there were any ſuch alteration in the beating of the *Heart*, as I then obſerved in her *Arteries*: I laid my hand upon her Breaſt, and I found that her *heart* did not beat as uſually it doth, the *bone* erecting it ſelf, and impelling the *left ſide*, but it ſeemed like a *great bullet* (tranſcending any proportion that is natural

tural to the *Heart*) as it rolled in the *Thorax* from the *right* to the *left side* (as much one way as the other) with an *uniform* and *equable revolution*, and thus it continued to do for an houre; during which time I obſerved all the *varieties* almoſt that are recorded about *evil pulſes*: as *quick*, *ſlow*; *great*, *ſmall*; *unequal*, *deficient*, *dicrotus*, &c. Nor is this new; for *Riolanus* ſaith in *Exam. Harvey* c. 3. *Notavi multoties in palpitationibus cordis vehementibus arterias non ſequi motum Cordis, ſed bis terve pulſare Cor pro una diaſtole Arteriarum: quod indicat Arterias in ſanis & agris corporibus, non ſemper ſequi motus cordis.* So doth *Mercatus* teach, *Fit interdum palpitatio cordis nihil mutatis pulſibus.* Tom. 2. de Philoſ. differ. l. 2. tr. 1. c. 28. & tom. 3. l. 2. c. xj.

Since the writing hereof, being caſually in the *ſhop* where an *old man* was blooded, who upon the healing up of an *old ſore* in his leg, was very ill: I obſerved his *blood* to have very little of what was *crimſon* in it: but it ſeemed all a *fluid Serum* to the bottom, (which was *pellucid*, not of a turbid *white*,) in ſome *Pottingers*: in one *Pottinger* that ran laſt, it was coagulated into a thicker maſs, on the top whereof was coagulated a *tranſlucid gelatine* over moſt of the *Pottinger*, the reſt being of a *fluid Serum* like to the *other*: I took ſome *ſpirit of Vitriol*, and poured a *preity quantity*, (*viz.* about 20 drops) on that which was partly *coagulated upwards*, partly *not*: and all that part which was not *blood*, did coagulate into a *maſs* like unto the *white* of an *Egge* when hardened by the *fire*, but without that *ſmell* which is uſual to it when coagulated upon a *gentle fire*: the *blood* under it coagulated into a conſiſtence much like wax: but of a *dark red* inclining to *black*: into another Pottinger I poured ſome of the *ſalt-peter-liquor* that had paſſed the *Aſhes*; but this latter cauſed no *change* at all: I then *poured* on *the ſame* ſome *ſpirit of Vitriol*, as in the other, and it did immediately turn *lacteous*, and coagulated into a maſs like to that of ordinary *cuſtards*: and the *blood* under, which ſeemed but very little, and ſcarce coagulated, appeared thereupon as a *large quantity*, equalling three parts of the *Pottinger*, upon which all the *Serum* was thus *coagulated*. I went to burn theſe:

that

that *blood* which had only *ſpirit of Vitriol* did not *crackle*, and ſcarce *burn*: though *a little* it did: the pure *coagulated Serum* did not burn at all, yet *crackled* like *decrepitating Salt*, a little: that with the *ſpirit of Vitriol* and *Lixivium of Nitre*, did burn with a *vivid* and *laſting flame* a long time.

I think my ſelf obliged to adde one thing more where I ſpeak as if Dr. *Willis* had had little to do in the diſcoveries of Dr. *Lower* about *Anatomy*: that although that great *Phyſician* had not leiſure to attend the *Anatomical Inquiries*, yet did he propoſe *new matter* for *improving the diſcoveries*, and put Dr. *Lower* upon continual inveſtigation, thereby to ſee if *Nature* and his *Suppoſitions* did accord: and although that *many things* did occur beyond *his apprehenſion*, yet was the *grand occaſion* of that work, and in much the Author. This *Intelligence* doth not croſs what *I* related before from *good teſtimony*; yet I thought my ſelf obliged to declare the *whole truth*, and ſuch I beleeve *this* to be. I muſt alſo profeſs that *I* think the *Sinus venarum vertebrales*, whoſe *invention I* aſcribe to Dr. *Lower*, may without *conſiderable injury* be aſcribed unto *Fallopius* in his Anatomical Obſervations pag. 193. edit. *Colonienſ.* 1562. in 8°. Thus much *I* thought fitting to annex, leſt the *Virtuoſi* ſhould cenſure me as partial to my old *School-fellow* Dr. *Lower*, or ſwayed by any regard then that of *Truth*.

The *Hogs-blood* which *I* laſt mentioned as poured upon the *Mothers of Salt-peter*; after it had ſtood above three weeks *unmixed*, did at laſt caſt down about half of *it ſelf* below the *Mothers*, it continuing in *that* place it turned *crimſon*: that on the *top* did not change its *colour*, but on the *ſurface* there gathered a *cruſt* or *maſs*, not very thick (as before) nor of ſo *ſolid* a *conſiſtence*.

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FINIS.

To divert my *Reader* after ſo tedious a diſcourſe, I ſhall here adde the Letter of *Coga* their *Patient*, that they may ſee how efficacious the Transfuſion hath been on *him*, and what returnes he makes for his *Cure*.

To the Royal Society the VIRTUOSI, and all the Honourable Members of it, the Humble Addreſs of

AGNUS COGA.

YOur Creature (for he was his own man till your Experiment transform'd him into another *ſpecies*) amongſt thoſe many alterations he finds in his condition, which he thinks himſelf oblig'd to repreſent them, finds a decay in his purſe as well as his body, and to recruit his ſpirits is forc't to forfeit his nerves, for ſo is money as well in peace as warre. 'Tis very miſerable, that the want of natural heat ſhould rob him of his artificial too: But ſuch is his caſe; to repair his own ruines, (yours, becauſe made by you) he pawns his cloaths, and dearly purchaſes your ſheeps blood with the loſs of his own wooll. In this ſheep-wrack't veſſel of his, like that of *Argos*, he addreſſes himſelf to you for the Golden Fleece. For he thinks it requiſite to your Honours, as perfect Metaplaſts, to transform him without as well as within. If you oblige him in this, he hath more blood ſtill at your ſervice, provided it may be his own, that it may be the nobler ſacrifice.

The meaneſt of your Flock,
AGNUS COGA.